

SERIES

SCIENCE

The Main Book

By A Group of Supervisors

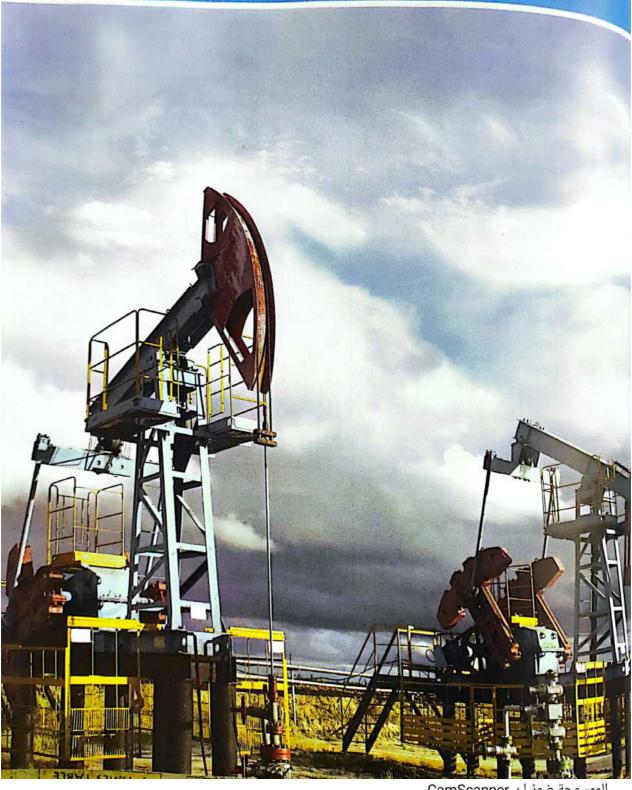


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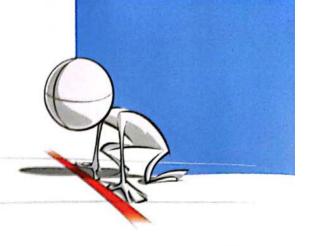
Theme Three: Protecting our Plang

Energy and Fuels



Get Started

What I Already Know



- During the first term of this year, you have learned the meaning of energy and its relationship with work and movement.
 In this unit, we are going to learn more about energy and fuel.
- There are many forms of fuel that man uses in his daily life such as :









- Man uses the energy produced from burning fuel in many purposes such as cooking, warming, moving carsetc.
- Also, man uses the energy produced from burning fuel in generating electricity that is used in lighting lamps and operating devices.
- In this unit we are going to study :
- Forms and types of fuel.
- Renewable and non-renewable resources of energy.
- Different uses of solar energy as a renewable resource of energy.
- Using wind and water to generate electricity.
- How we can conserve energy.

• Unit Project : The Effect of Building Dams :

- At the end of this unit, you are going to do a research project about "Water" as one of the energy resources and how to use the kinetic energy of the flowing water of rivers to generate electrical energy by building dams on these rivers.
- You will also search for the effect of the constructing of these dams on the surrounding environment.



Water dam









- Most of the energy we use is produced inside the Sun.
- Energy can be changed from one form to another.
- The pictures above show some of the devices in which energy is converted.

What types of energy transformations are required for sunlight to operate devices?

- Different devices can convert the light energy that comes from the Sun into different forms of energy such as in solar powered calculator, the solar cells changes the energy of sunlight into electrical energy which is used to operate the calculator.
- Most devices depend on electricity, and to generate electricity, we can convert the energy of the Sun in different ways.

In this concept, we will study:

- Energy in toy cars that can be controlled remotely.
- Mars exploration rover.
- · Energy chains.
- Energy and devices that we use in everyday life.
- · Conservation of energy.
- Tracking of energy path.

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produce	THE STREET, STREET	- ster colle	خلايا شمسية	operate	عمل
convert	يتحول	solar cells			طاقة
roquired	مطلوب	devices	اجهزة	energy	طاقة
required					

15

Energy in Remote-Controlled Cars Activity 2

- ▶ Look at the opposite pictures, then put (✓) or (✗):
 - 1. The child in picture (1) use a remote control to move the car.
 - 2. The child in picture (2) can move the car remotely.
 - 3. Both cars in the opposite pictures need electric energy to move.

Picture (1)



Picture (2)

Energy in remote-controlled cars:

- Many toys such as cars, trucks, planes, boats and small robots may operate remotely.
- However, all of these toys need energy to move and perform activities like spinning in the corners and moving forward or backward remotely.



How do those toys get energy?

Batteries inside the toys are the resource of chemical energy that is converted into electrical energy.



The electrical energy is converted into kinetic energy or sound energy to move the toys and make them perform their activities.

But, what do we do when the batteries of these toys run out?

Batteries can be recharged by connecting the device to a nearby charger, or by replacing the old batteries with new ones.





Check your understanding

Complete the following sentences using the words below:

(kinetic - chemical - electrical)

- The energy stored in batteries isenergy.
- 2. In batteries of a remote-controlled toy, chemical energy is converted into energy, which is converted intoenergy or sound energy.

remote control robots

resource

trucks طاقة كهربية electrical energy جهاز تحكم sound energy إنسان آلي recharge مصدر

perform طاقة صوتية batteries إعادة شحن

طاقة كيميائية chemical energy شاحنات kinetic energy أداء / عمل run out بطاریات

Activity 3 Mars Rover

- Have you ever seen a picture of an exploration rover on Mars ?
- This rover shown in the picture below needs energy to be operated, so it can explore Mars. Have you thought about how it gets the energy it requires to be operated?

Mars exploration rover:

- Mars is about 54 million kilometers away from Earth, so the spacecraft will take about six months to go that distance.
- In the last few years, man has sent many missions to Mars. None of these missions included people, but they had vehicles or robots which are operated remotely.
- The "Mars rover Curiosity" which travels on the surface of Mars, is one of the most well-known of these robots.



Mars rover Curiosity

- These robots, like remote-controlled toys, require energy to be operated, but the batteries used in the toys cannot be used in Mars rover Curiosity as it is too distant from a store or charger plug on Earth.
- ▶ What is the resource of energy that Curiosity exploration rover needs to be operated?

The Curiosity exploration rover uses solar panels and batteries (which are charged by solar energy) as a resource of energy, where:

- The solar panels on the rover convert solar energy into electrical energy, which is used to charge the rover's batteries.
- The electrical energy from the batteries powers the vehicle's sensors and the electrical energy is also converted into kinetic energy and thermal energy as the vehicle moves across Mars surface.



Check your understanding

Complete the following sentences using the words below:

(kinetic - electrical - solar)

The solar panels on the Curiosity exploration rover convert energy into energy, which is converted into and thermal energy.

In the Assessment Book: Try to answer: Self-Assessment (1)

Mars exploration distance

vehicles كوكب المريخ solar energy استكشاف missions طاقة حرارية thermal energy مسافة / بُعد

rover مرکبات spacecraft طاقة شمسية

plug arregb solar panels مركبة فضائية sensors مهمات

قابس كهرباء ألواح شمسية 17 اجهزة استشعار

Exercises on Lesson 1

• Create Evaluate Analyze **O** Apply Understand Choose the correct answer: 1. Toy cars need energy to do all the following functions, except b. rotation in a circle. a. moving forward and backward. d. rotation around the moon. c. moving right and left. 2. In the battery of a toy car energy is converted into electrical energy, d. thermal c. light b. sound a. chemical 3. Electrical energy produced from a toy car battery can be converted into and energies. b. mechanical - thermal - solar a. mechanical - sound - solar d. sound - thermal - solar c. mechanical - sound - thermal 4. The energy source in a toy car is the d. fuel. c. battery. b. tires. a. engine. 5. It takes several for a spacecraft to travel from Earth to Mars. d. months c. days b. minutes a. seconds 6. Curiosity rover is designed to explore d. the moon. c. the Sun. b. Mars. a. Earth. 2 Put (v') or (x): 1. Energy cannot be transformed from one form to another. 2. We can convert the solar energy into different forms of energy. 3. A toy car can continue moving even after its battery runs out. 4. Curiosity is a vehicle that travels across the surface of the planet Mars. 5. Mars is located a few meters away from Earth. 6. Without electrical energy, Mars rover Curiosity cannot move or communicate with Earth. 3 Correct the underlined words: 1. The solar energy produced from the moon can be converted into different forms of energy. (.....) 2. Toy cars depend on fuel as a source of electrical energy. 3. Curiosity is a robotic vehicle that is designed to explore the surface

of moon.

(.....)

E	Write the scientific term of each of the following:
•	The source of energy in some toys that stores chemical energy.
٠	2. The energy produced from batteries. ()
•	3. A robotic vehicle designed to explore the surface of Mars. (
E	Complete the following sentences :
٠	1. The energy can be from one form to another.
•	 Remote controlled toy cars converts energy stored in its batteries into energy that in turn is converted into energy which is used to move the car.
•	3. To operate an electric mixer we use energy.
	 When your cell phone is out of charge, you must recharge its to operate it again.
	Some calculators can change solar energy into energy by using the sunlight.
•	6. On planet Mars, Curiosity robot is operated by using energy from sunlight that is converted into energy used to recharge its batteries.
	2. Some calculators use the sunlight to operate.
	Mars rover Curiosity operates for a long period of time on Mars without any need to be recharged.
6	What happens if?
-	1. Batteries of remote-controlled toy car run out.
	Solar calculators were exposed to the sunlight.

3. Mars rover Curiosity didn't get any sunlight on Mars surface.

8 Look at the following figures, then put (\checkmark) or (x):



Car (1) Mars rover Curiosity



Car (2) Toy car

- The movement of the two cars can be controlled from a distance by using a remote control.
- 2. Car (2) uses sunlight to move.
- The two cars can convert the chemical energy stored in their batteries into electrical energy.
- We can use an electric cable to recharge the battery that is placed in car (1) again if it runs out.

LESSON

Activity 4



What Do You Already Know **About Devices and Energy?**

•	Put (V	or	(X)	in	front of	fthe	follow	ng	questions	:
---	--------	----	-----	----	----------	------	--------	----	-----------	---

- 1. Television needs sound energy to be operated.
- 2. Electrical energy is needed to operate an electric fan.

How does energy change (transform)?

Device	Consumed energy (input energy)	Produced energy (output energy)
Hair dryer	Electrical energy.	Thermal energy and sound energy.
Soap dispenser (Detergent bottle)	Potential energy (stored in the spring of the soap dispenser).	Kinetic energy (the movement of the soap upward).
Washing machine	Electrical energy.	Kinetic energy and sound energy.

When you rub your hands, you will feel warm because kinetic energy (consumed energy) is converted into thermal energy (produced energy).



Check your understanding

▶ Put (√) or (x):

- 1. The consumed energy in the blender is sound energy.
- 2. The produced energy in remote-controlled toy car is chemical energy.

	فرك	,
	زنبرك	,
u	منظة	,

transform	تحول	hair drye
consumed ener	gy	washing
	طاقة مستهلكة	blender

Activity 5 Energy Chains

- You have learned that most of the energy we use is made inside the Sun.
- In this activity, we will discover how energy is transmitted from its resource to the devices we use.
- Energy chains:
 - Energy chain is a way to describe the energy flow that occurs when we use different devices.
 - Energy chains often start with the Sun.
 - Now, we will study some examples of energy chains.

Energy chain when eating food:

The Sun emits light energy that reaches a plant such as an orange tree.



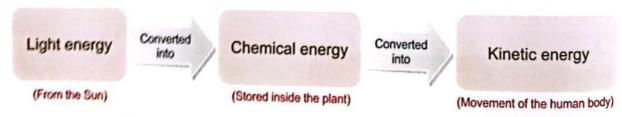
The green plant converts light energy comes from the Sun into chemical energy, which is stored in the form of sugars inside the plant.



When you eat an orange, your body converts the chemical energy stored inside the fruit into kinetic energy when your body move.



▶ The following diagram shows the energy chain in the previous example :



energy chain 22 transmitted

stored سلسلة الطاقة flow تنتغل

light energy مُحْزَن emit تدفق

طاقة ضوئية

Energy chain when heating a pot of water over a fire:

Light energy comes from the Sun causes the growth of trees.



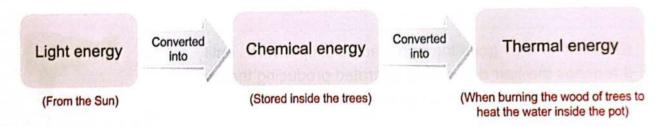
This light energy is converted into chemical energy which is stored in the form of sugars inside the trees.



When the wood of trees is burned, thermal energy is released which heats the water inside the pot.



▶ The following diagram shows the energy chain in the previous example :





 When you go for a walk, there is a change of energy takes place inside your body.

Because the chemical energy stored in the food is converted into kinetic energy that helps your body move.

2. There is a change of energy when burning some wood of trees.

Because the chemical energy stored inside the wood of trees is converted into thermal energy.

Energy chain in a hair dryer:

Light energy from the Sun causes the growth of trees.

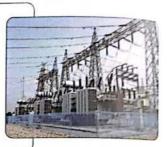


Coal is formed from the remains of dead trees that buried deep in the Earth over millions of years so, coal is a resource of energy that stores chemical energy.



Coal is used in electric power stations (power plant), because :

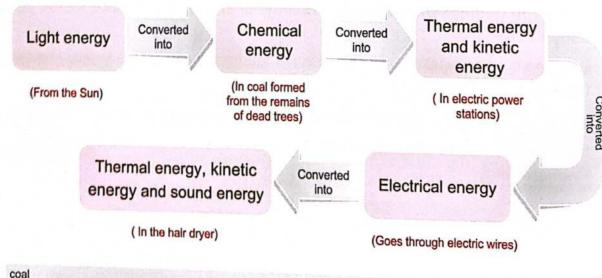
- When coal is burned, it produces thermal energy.
- 2. Then thermal energy is converted into kinetic energy which is used to operate certain devices in these stations in order to generate electrical energy.



Electrical energy goes through electric copper wires until it reaches the hair dryer to be operated producing thermal energy, kinetic energy and sound energy.



▶ The following diagram shows the energy chain in the previous example:



دفيت

- 1. Not all the energy in an energy chain reaches the device.
- 2. Some of the energy is wasted while travelling through the energy chain, as it is converted into other forms of energy. This is because energy is not destroyed but it is converted into other forms of energy that the device does not use.
- 3. Most of the wasted energy leaks out in the form of heat.



Check your understanding
Complete the following sentences using the words below :
(electrical – heat – chemical – coal – kinetic – Sun – thermal)
1. Most of the energy we use is produced inside the
2. When you eat, your body turns theenergy found in the food intoenergy that helps your body move.
3. In electric power stations, is burned to generate energy.
4. In an electric iron, electrical energy is converted into energy.
5. In several electrical devices, most of the waste energy leaks out in the form of

Energy and Everyday Devices Activity 6

- In this activity, you will use what you know about types of energy to describe the consumed energy and the produced energy in different devices.
- The following table shows the function, the energy consumed and the energy produced in some devices :

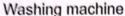
Device	Function	Consumed energy (input energy)	Produced energy (output energy)
Electric bulb	Lighting	Electrical energy	Light energy and thermal energy
Battery powered clock	Showing the time	Chemical energy	Kinetic energy
Flashlight	Lighting	Chemical energy	Light energy and thermal energy
Hand bell	Alerting	Kinetic energy	Sound energy
Electric heater	Warming	Electrical energy	Thermal energy



Check your understanding

▶ Write the name of the suitable device below of each sentence:







Speakers



Electric iron



Electric lamp



Drum

- 1. A device which converts electrical energy into sound energy only.
- 2. A device which converts electrical energy into light energy.
- A device which converts kinetic energy into sound energy.
- A device which converts electrical energy into kinetic energy.
- 5. A device which converts electrical energy into thermal energy only.

In the Assessment Book:
Try to answer:

Self-Assessment 2

Exercises on Lesson 2

Create Analyze O Apply Evaluate Understand Choose the correct answer: 1. In the hair dryer, the electrical energy is converted into, and energies. a. sound - thermal - kinetic b. kinetic – light – chemical d. light – sound – electrical c. thermal – light – chemical 2. In the washing machine, the energy is converted into kinetic and sound energies. b. electrical a. light d. potential c. thermal 3. You feel warm when you rub your hands together, because energy is converted into thermal energy. a. kinetic b. light c. electrical d. sound 4. Plants can convert the light energy from the Sun into energy which is stored in the plant in the form of sugar. a. sound b. electrical c. chemical d. kinetic 5. When you eat an apple, your body converts the energy stored in the apple into energy when you move. a. chemical - electrical b. kinetic - chemical

bulb ?

a. Electrical. b. Light. c. Thermal. d. Sound.

8. When you use the hand bell, the energy is converted into sound energy.
 a. light b. thermal c. kinetic d. electric

c. Electrical — chemical — light. d. Light — chemical — electrical.

10. If the energy doesn't go through the electric fan's wire, it will not turn on.
a. sound b. electrical c. kinetic d. thermal

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the kinetic energy.	(,
Put (V) or (X):		
Put (v') or (x): 1. In the soap dispenser, potential energy is converted into kinetic energy. 1. In the soap dispenser, sound energy is converted into electrical energy.	()
2 In the electric dieficial	()
and kinetic energy.	()
and kinetic energy. 3. Most of energy chains starts with the moon. 3. Most of energy chains starts with the moon.	•	
3. Most of energy chains down 4. Light energy from the Sun helps trees to grow. 5. Both the hair dryer and the washing machine depend on the same kind 5. Both the pair dryer and the washing machine depend on the same kind	()
of energy to operate. 6. In electric power stations, sound energy produced from burning	()
of coal is converted into electrical energy. of coal is converted into electrical energy.	()
of coal is converted into electrical energy. 7. There is energy waste when energy is transformed from one form to another.	ì)
7. There is energy waste with one of the some devices.	,	,
8. Energy can be destroyed inside energy to operate.	,	,
 8. Energy can be destroyed inside 9. The electric bulb depends on chemical energy to operate. 10. Both the electric bulb and the electric heater produce thermal energy. 	(_
Write the scientific term for each of the following:)
1. The energy produced from a battery. (
to operate a television.		
for most for		
3. The main source of energy for most forms 4. The energy produced when the wood of trees is burned. 4. The energy produced when the wood of trees is burned.)
in the remaining of dodd a see		
5. The substance that is produced from the remained that buried deep in the Earth over millions of years. ()
that buried deep in the Latti over this seed to operate an electric heater. ()
6. The energy that is used to operate an electric heater.)
7. The energy stored in coal.		
Complete the following sentences :		
1. The energy produced from the battery and used to operate a toy car is		
energy.		
2. When you press on the soap dispenser, energy stored in its spring is	S	
converted into energy that moves the soap upward.		
3. The energies that are produced from the washing machine are energy.	gy	
4. When you rub your hands together, the energy is converted into		
energy.		
5. In any energy chain, some of the energy is wasted in the form of		
6. The electric lamp converts electrical energy into energy and en	nerg	ıy.

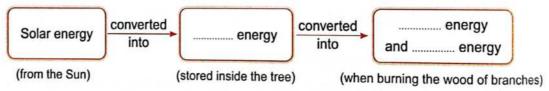
- 1. There is an energy change when you press the spring of a soap dispenser. Give reasons for :
 - 2. When you rub your hands together, you feel warm.

Understand

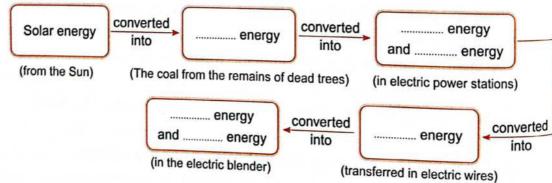
- 3. Not all the energy that enters the energy chain completely reaches the device.
- 6 What happens to ...?
 - The change of energy when you turn on the television.
 - 2. The change of energy when you burn a piece of wood.
 - 3. The change of energy when you shake a small bell with your hand.
- Use the following words to complete the energy chains below. (You may use the same word more than once).

(Thermal – Chemical – Kinetic – Electrical – Sound – Light)

The energy chain of burning some branches of a tree :



2. The energy chain to operate electric blender.



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Choose from column (A) what suits it in both columns (B) and (C):

(A) Energy used	(B) The device	(C) Energy Produced
1. Kinetic energy	a.	A. Thermal energy.
2. Electrical energy	b.	B. Chemical energy.
3. Solar energy	c.	C. Sound energy.

1.	 -	

2		
۷.	 -	•••••

LESSON

Activity The Conservation of Energy

- ▶ Look at the opposite picture, then put (✓) or (✗):
 - 1. In the guitar, sound energy is converted into kinetic energy.
 - 2. The chemical energy stored in the body of the boy is a part of energy conversion when playing the guitar. (



- In the previous lesson, we have learned that energy can be transformed from one form to another.
- Now, let's study some examples of energy transformation.

Energy chain while riding a bike:

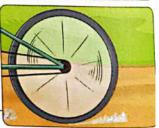
When you eat, the chemical energy stored in the food provides your body with energy.



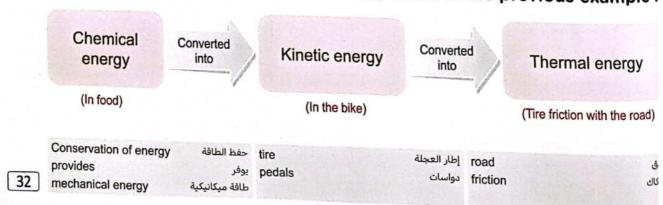
When you ride your bike and push the pedals, this chemical energy is converted into kinetic energy (mechanical energy), which causes the bike to move.



Some of the kinetic energy, is converted into thermal energy due to the tire friction with the road.



▶ The following diagram shows the energy chain of the previous example:



Energy chain when a light bulb is switched on:

When you turn on a light bulb, the electrical energy that goes through the electrical wires is converted into light energy when it reaches the bulb.





If you put your hand near the light bulb, you can feel heat comes out of the light bulb because some of the electrical energy is also converted into thermal energy.



▶ The following diagram shows the energy chain of the previous example :

Electrical energy

Converted into

Light energy and thermal energy

(In electrical wires)

(In the light bulb)

From the previous examples, we can conclude that :

Energy can be changed from one form into another, where the new energy cannot be created from nothing, and the old energy does not disappear but it changes from one form of energy into another, this is called "the law of conservation of energy"

The law of conservation of energy:

Energy can neither be created nor destroyed, but only converted from one form of energy into another.



Check your understanding

▶ Put (√) or (x):

- When you ride a bike, some of the kinetic energy is converted into thermal energy due to the friction between tires and the road.
- 2. Electrical energy is converted into light energy and sound energy when a light bulb is switched on.

n the Assessment Book:	
Try to answer :	
Self-Assessment 3	
The second secon	

switched on create

disappear مفتوح wires destroy تختفی أسلاك

يدمر / يفني

Exercises on Lesson 3

Create Evaluate Analyze Apply Understand Choose the correct answer: 1. In the electric water kettle, electrical energy is converted into energy that can warm the cold water inside it. d. kinetic b. thermal c. light a. sound 2. While playing a guitar, energy is converted into sound energy. c. chemical d. potential a. kinetic b. light 3. Inside a light bulb, electrical energy is converted into and energies b. sound - thermal a. sound - light c. kinetic - light d. light - thermal 🛉 4. When you turn on a light bulb, the electrical energy travels throughuntil reaching the bulb. a wires b. glass c. wood d. plastic Both the hair dryer and the electric water kettle produce energy. a. chemical b. thermal c. light d. potential 6. Some kinetic energy is converted into energy due to friction of bike's tire with the road a. light b. electrical c. potential d. thermal 2 Put (\(\nu\)) or (\(\lambda\): 1. There is a stored chemical energy inside the food we eat. 2. As a result of friction between bike's tire and the road, kinetic energy is converted into chemical energy. 3. When pedalling a bike, the chemical energy in your body is converted into kinetic energy. 4. Energy can't be changed from one form to another. Write the scientific term for each of the following: 1. A form of energy produced from the electric lamp and affects our eyes. (.....) 2. Energy can neither be created nor destroyed, but only converted from one form to another. 3. The energy produced from playing guitar. 🍦 4. The energy used to play a drum.

Complete the following sentences:

- 1. When you ride a bicycle, energy stored in your body is converted into energy which causes the bicycle to move.
- Some kinetic energy of the bicycle is converted into energy due to the friction of its tires with the road.
- 3. The electric lamp converts energy into light energy and energy.
- The change of electrical energy into sound energy in the radio is an example that proves the law of
- 5. Energy can neither be nor , but only from one form to another.

Give reasons for :

- 1. You feel heat, when you put your hands near a lighted electric lamp.
- 2. The presence of batteries inside a toy car.
- 6 What happens if you put your hands near the lighted lamp?
- 7 Look at the following figures, then complete the following sentences:

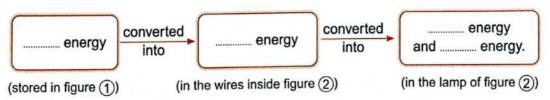


Figure (1)



Figure (2)

- 1. Figure (1) converts energy into energy.
- 2. Figure (2) converts energy into energy and energy.
- 3. The energy chain that is produced due to inserting figure (1) inside figure (2) and turning it on is :





Look at the following picture, then put (√) or (X):



- All of the energy that enters the mobile phone (cell phone) is converted into light energy.
- 2. Some of the energy in the mobile phone comes out as sound energy.
- According to the law of conservation of energy, we know that energy is conserved and is neither created nor destroyed.
- All the energy that enters a device must finally come out of it, either in the same form or in other forms.
- All devices have energy coming in and out of them, where:
 - The energy that comes in a device is called "input energy".
 - The energy that comes out a device is called "output energy".
- In this lesson, we will learn how the energy used to run a device is converted into other forms of energy, and where it flows.

Energy path tracking:

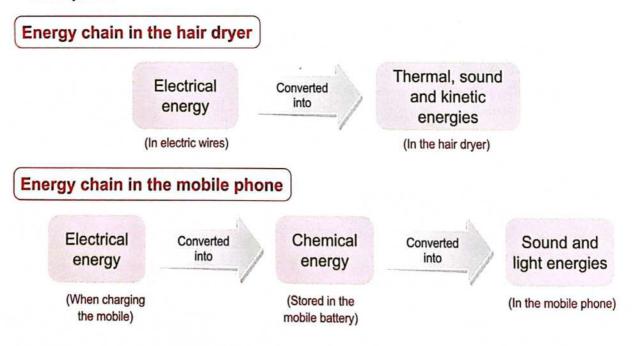
 When we track the path of energy in any device, it looks like the device is losing energy, but the energy is actually being converted into another form, and some of the converted energy is not helping the device do its main function.

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► The table below shows examples of input energy and output energy in some devices :

Device	Its function	Input energy	Output energy
Hair dryer	Drying hair.	Electrical energy (In electric wires).	 Thermal energy (Heat produced from the hair dryer). Sound energy (Sound produced from the hair dryer). Kinetic energy (Fan movement and airflow inside the hair dryer).
Mobile phone	Ringing, illuminating, and processing information.	Electrical energy (When charging the mobile phone and this electrical energy is stored inside the battery as chemical energy).	 Light energy (Light produced from the mobile phone). Sound energy (Sound produced from the mobile phone).

► The following diagrams show the energy flow chains of the previous examples:



-			
O			
	M	ΛT	ΩS
-		v	~~

1. Noise (sound energy) from a hair dryer is considered as "wasted energy" because sound energy does not help the device do its main function.

2. When using a mobile phone for a long time, some energy is wasted as thermal energy that does not help the device do its main functions.

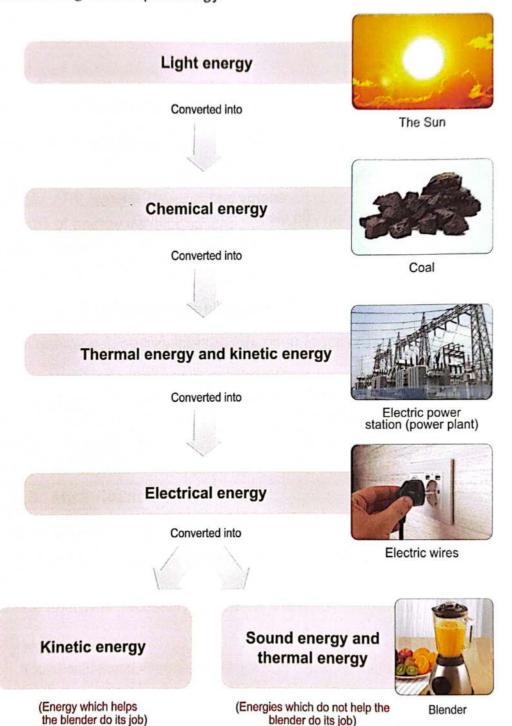
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jain.	-	N		ľ
	-	5	31	١
١.	_	-1	٦	۱

Check your understanding

Put (v) or (x): 1. Some of the output energy does not help the device do the function	1 ,
for which it was designed.	(
2. The input energy in the hair dryer is chemical energy.	(
3. The output thermal energy from a hair dryer is considered wasted energy because it does not help the device do its main function.	(
4. The mobile phone stores electrical energy in its battery in the form of chemical energy.	(

Activity Build an Energy Chain

- In the previous lessons, you have learned some examples of energy chains.
- Now, we will build an energy chain that shows the flow of energy starting with input energy and ending with output energy.





Complete the following energy chain in a television:

annum	energy (from the Sun)
	Converted into
	energy (stored in coal)
	Converted into
	energy andenergy lectric power stations)
	Converted into
	energy (in electric wires)
energy and	Converted into
energy	energy
Energies which help the television do its job)	(Energy which does not help the television do its job)

Record Evidence Like A Scientist Activity 10

- In this concept, you have learned a lot about energy and how different devices get the energy that they need to be operated.
- In this activity, which will be repeated at the end of each concept, we will learn how to think like scientists to answer a question about one of the main points of this concept through four main steps:
 - Step (1): The Question.
- Step (2): My Claim.
- Step (3): My Evidence.
- Step (4): My Scientific Explanation.

Step 1 The Question

What forms of energy transformations must occur for sunlight to operate electrical devices?

Step 2 My Claim

Forms of energy can be transformed into other forms of energy.

Your claim should be formed of a sentence that gives an answer for the previous question in step (1).

Step 3 My Evidence

- Almost all the energy we use comes from the Sun.
- Energy from the Sun can be converted into other forms of energy by technology.
- Electrical energy is necessary to operate the electrical devices.

You should mention enough and suitable evidence that support your claim.

Step 4 My Scientific Explanation

- Almost all the energy we use originally comes from the Sun.
- The energy from the Sun is stored as chemical energy in sources like coal that can then be used to produce electricity at a power plant.
- Electrical devices can transform the electricity into other forms of energy, such as :
 - An electrical lamp transforms electrical energy into light and thermal energy.
- The battery of a cell phone transforms electrical energy into chemical energy stored inside the battery that changes into electrical energy again to operate the cell phone.

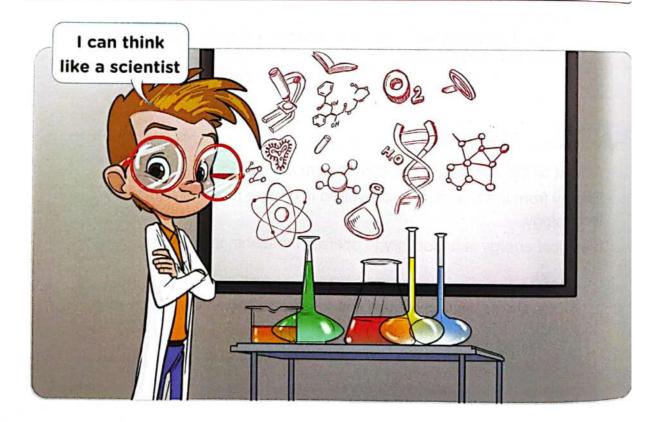
Note

Your scientific explanation should explain your claim and evidence introducing some supportive examples from what you have learned.

Optio

Optional Digital Activity

Activity "Careers and Energy in Systems" in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.



Activity Review : Devices and Energy

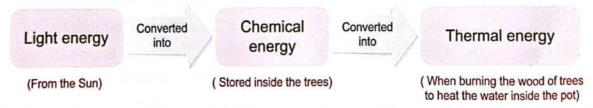
- ▶ We can summarize this concept in the following main points :
- Batteries inside the remote-controlled toys are the resource of chemical energy, as this energy is converted into electrical energy, which is converted into kinetic energy or sound energy.
- When the batteries run out of charge, they can be recharged by connecting the device to a nearby charger or by replacing the old batteries with new ones.
- Mars rover Curiosity uses solar panels and batteries (which are charged by solar energy) as a source of energy, where:
 - The solar panels on the rover convert solar energy into electrical energy, which is used to charge the rover's batteries.
 - The electrical energy from the batteries powers the vehicle's sensors and the electrical energy is also transformed into kinetic energy and thermal energy as the vehicle moves across Mars' surface.

The table below shows the energy consumed and energy produced in some devices.

Device	Consumed energy	Produced energy
Washing machine	Electrical energy	Kinetic energy and sound energy
Electric heater	Electrical energy	Thermal energy

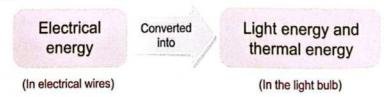
- · Most of the energy we use is produced inside the Sun.
- Energy chain is a way to describe or represent the energy flow that occurs when we use different devices.
- · Energy chains often start with the Sun.

Example: Energy chain when heating a pot of water over a fire.



 Some of the energy is wasted in different forms, while travelling through the energy chain, where most of the lost energy leaks out in the form of heat.

Example: Energy chain in a light bulb.

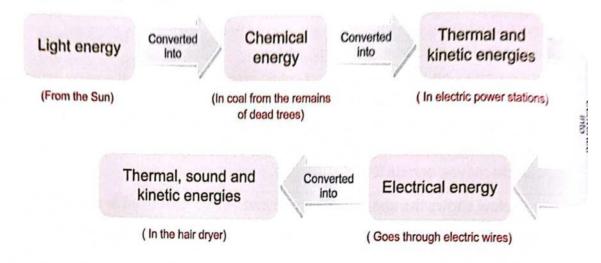


The law of conservation of energy:

Energy can neither be created nor destroyed, but only converted from one form of energy into another.

 All the energy that enters a device must finally come out of it, either in the same form or in other forms. All devices have energy coming in them (called input energy) and coming out of them (called output energy).

Example: Energy chain in the hair dryer.



When we track the energy flow in any device, we notice that sometimes the
converted energy does not help the device do the function for which it was
designed, such as the sound energy produced by the hair dryer in the previous
example.

In the Assessment Book:

Try to answer:

• Self-Assessment 4

• Model Exam on Concept (3.1)

Exercises on Lesson 4

Understand

Apply Analyze Evaluate 1 Choose the correct answer: 1. The input energy when using the hair dryer is the energy. a. electrical b. potential c. kinetic d. thermal 2. Which form of energy is not an output energy when a hair dryer is used? a. Kinetic energy. b. Electrical energy. d. Sound energy. c. Thermal energy. 3. During charging a mobile phone, the energy is converted into energy that is stored in the phone battery. b. chemical - thermal a. electrical - chemical d. thermal - chemical c. electrical - thermal 4. Sound and energies are output energies when operating the mobile phone. b. potential a. electrical c. chemical d. light 5. The output energy when playing drums is the energy. b. light a. chemical d. potential c. sound • 6. The produced energy does not help the blender do its job. b. sound a. chemical d. potential c. light 7. When a piece of coal is burned, energy is produced. b. solar a. thermal d. potential c. sound 8. When a football player runs, the chemical energy inside his body is converted into and energies. b. kinetic - light a. potential - light d. thermal - light c. thermal - kinetic 2 Put (\(\sigma\) or (\(X\): 1. Energy may be destroyed inside different devices. 2. Some of the converted energy does not help some devices do the function for which it was designed. 45

Create

Understand

 3. The produced sound energy helps the hair dryer to do its function 	n. (
 4. The input energy in a hair dryer is the chemical energy. 	,
5. The energy chain of a burning wood is : Chemical energy into Thermal and light	al energy nt energy (
6. In waterfalls, the water that falls down has kinetic energy.	(
Write the scientific term of each of the following:	
 The energy that is stored in both batteries and food. 	(
 2. The energy that is produced from the electric power stations 	***************************************
and flows through wires.	(
 3. A form of energy that is produced from the electric heater 	
and burning coal.	(
4. The energy that is produced from the blender and helps it do	
its job.	(
5. The wasted energy when using a mobile phone for a long time.	(
Complete the following sentences :	
1. The mobile phone converts chemical energy stored in its battery it	nto
energy and energy, and by using it for a long time, some	
lost in the form of energy.	0,
2. The input energy of a hair dryer is energy, while the out	tput energies
of a hair dryer are energy, energy and	energy.
3. The wasted energies that are produced from a vacuum cleaner are	е
energy and energy.	
4. The main function of a blender is done by the help of the produced energy.	d
5. The input energy in an electric bulb is energy, while its of	output
energies are energy and also energy which of in its main function.	Joesn't help
6. The input energy when recharging a mobile phone is er	neray which is
stored in the form of energy inside the phone battery.	
7. In the electric heater, energy is considered as an input e	eneray while
thermal energy is considered as energy.	morgy, mine
8. The kinetic energy in a hand bell is considered as energy	ıv. while in an
electric fan is considered as energy.	,,

The electrical energy that dryer in the same form of	t enters the hair dryer does not come out of the hair energy.
Sound energy and therm the blender.	al energy are considered as wasted energy in
/hat happens if?	
You use a mobile phone	for a long time. (according to the wasted energ
You turn on an electric fa	
	n. (according to the change of energ
	res, then complete the following energy chain:

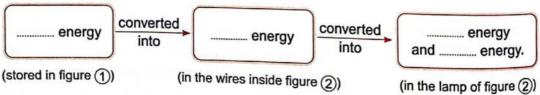
Model Exam on Concept (3.1)

	iotal mar
	20
(A) Choose the correct answer: 1. The energy source in a toy car is the state of the correct answer in the co	15
 a. engine. b. tires. 2. When you use the hand bell, the a. light b. thermal 3. During charging a mobile phone, the energy that is stored in the phone a. electrical – chemical c. electrical – thermal 	c. battery. d. fuel energy is converted into sound energ c. kinetic d. electric
a. light b. electrical (B) What happens if solar calculators we	
(A) Put (V) or (X): 1. Energy can't be changed from one 2. The produced sound energy helps 3. Curiosity is a vehicle that travels as 4. In the soap dispenser, potential energy	the hair dryer to do its function. (
(B) Look at the following figures, then c	complete the following sentences:
***	Service Servic

Figure (1)

Figure (2)

- 1. Figure (1) converts energy into energy.
- 2. Figure (2) converts energy into energy and energy.
- 3. The energy chain that is produced due to inserting figure (1) inside figure (2) and turning it on is:



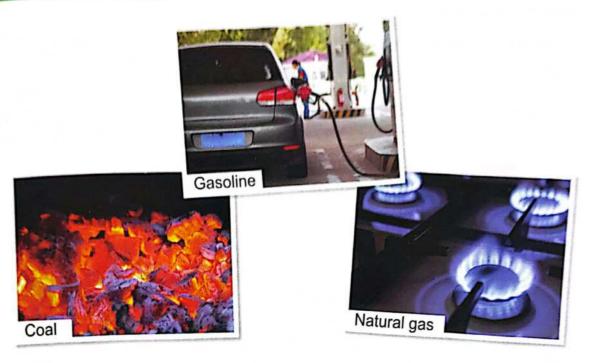
3	(A) Correct the underlined words:	mari	ks)
	Mars rover Curiosity is designed to explore Earth planet.)
	Most of energy chains start with the moon. ()
	3. There is a stored thermal energy inside the food we eat. ()
	4. The input energy in a hair dryer is the chemical energy.)
	(B) Give a reason for the following:		
	Thermal energy in a mobile phone is considered as a wasted energy.		
4	(A) Write the scientific term of each of the following:	5 mar	ks)
	The energy produced from batteries. ()
	2. The energy used to play a drum. ()
	The energy that is produced from the electric power stations and flows	;	
	through wires. ()
	4. The energy produced when the wood of trees is burned. (•••••)
	(B) Look at the following figures, then put (\checkmark) or (x) :		
	Car (1) Car (2)		
	Mars rover Curiosity Toy car		
	 The movement of the two cars can be controlled from a distance by us 	ing	
	a remote control.	()
	2. Car (2) uses sunlight to move.	()
	3. The two cars can convert the chemical energy stored in their batteries	,	١
	into electrical energy. 4. We can use an electric cable to recharge the battery that is placed in	()
	car (1) again if it runs out.	()



الممسوحة ضوئيا بـ CamScanner







- In the previous concept, you have learned about energy chains and that the Sun is the main source of energy.
- Fuel is one of the most important resources of energy that humans depend on to get energy.

Fuel:

It is any substance that produces thermal energy when it is burned.

- · We use fuels in many purposes such as :
 - Warming our houses.
 - Supply cars with energy to move.

▶ Where does the fuel we use every day come from ?

- The pictures above show several forms of fuels such as gasoline, coal and natural gas that we use in our daily lives, for example:
 Gasoline from the gas stations comes from oil which is extracted from the underground.
- In this concept, we will study:
 - · Types of fuel.
 - Fossil fuel formation.
 - Conserving fossil fuels.
- · Oil and water.
- · Using fossil fuels to generate electricity.

resources محطات الوقود معلى natural gas الغاز الطبيعى depend on يعتمد على gas stations معادر purposes والموقود الحفرى extract يستخرج supply معادر coal معادر oil الفحم gasoline يبتدرج gas oil والفحم coal معادر المعادر والمعادر و

Activity Fuels and Road Trips

- ► Look at the opposite picture, then put (✔) or (メ):
 - Cars can move on roads when they run out of fuel.
 - Cars need fuel to get energy to move.



- Think about a trip with your family using a car. Read this story to learn why fuel is so important on road trips.
 - One morning, Hany's family woke up and decided to travel to Alexandria to visit aunt Nora, who lives there. Hany, his mother and sister Samar got Into the car.
 - While driving down the highway, Samar noticed that the gasoline pointer was close to zero and she sald to her mother that the fuel was running out and she needed to stop at the nearest gas station.
 - Hany's mother drove to the nearest gas station, where a station worker filled the tank and then she drove the car again.
 - Hany asked his mother, "Why does a car need fuel to move?" She said the car needs fuel to move because the fuel is burned inside the car engine, allowing the engine to rotate the wheels, so without fuel, the car will not move.







From the previous story, we can observe that:

Fuel is important to move cars, where the fuel is burned inside the car engine producing thermal energy that is converted into kinetic energy which causes the car to move.



Check your understanding

▶ Put (√) or (x):

- Cars need a source of energy to move.
- 2. The fuel is burned inside the car engine, allowing the engine to rotate the wheels. (

run out

highway pointer 54

engine wheels notice close to tank

Activity 3 What Do You Already Know About Fuels?

In this activity, we will learn more about different forms of fuel and their uses.

Uses of some different forms of fuel:

Fuel is used for several purposes, such as :

Coal and wood

They are used in:

Cooking food



Gasoline and natural gas

They are used in:

Generating electricity



Operating all means of transportation



▶ The following energy chain shows how fuels such as coal can be used to get thermal energy:

Light energy

Converted into Chemical energy

Converted into

Thermal energy

(From the Sun)

(Stored inside coal)

(When burning the coal)



Check your understanding

▶ Complete the following sentences using these words:

(coal - thermal - gasoline - natural gas)

- 1. Fuel is used as a source of _____ energy.
- 2. Burning of or allows cars to move.
- 3. Wood and are used as sources of thermal energy for cooking food.

In the Assessment Book:

Try to answer:
Self-Assessment 5

transportation يشغل

means النقل

وسائل

55

Exercises on L	esson	1
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Understand

OApply

Analyze

Evaluate

• Create

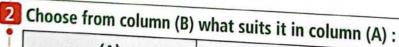
Choose the correct answer:

- Among forms of fuel that present in car fuel stations are
 - gasoline and wood.
 - b. natural gas and coal.
 - c. wood and coal.
 - d. gasoline and natural gas.
- 2. When the speed of a moving car decreases gradually until it stops, this may happen due to all the following situations, except
 - a. gasoline is completely run out.
 - b. the car engine is damaged.
 - c. the driver presses the brakes pedal.
 - d. the driver presses the gasoline pedal.
- 3. The opposite figure represents the fuel indicator of a car, which referes to that the fuel tank
 - a. is completely empty from gasoline.
 - b. is completely full of gasoline.
 - c. has half amount of gasoline.
 - d. has half amount of water.
- 4. We can use the energy obtained from burning of wood directly for all of the following purposes, except
 - a. warming houses.

b. operating television.

c. cooking food.

d. boiling water.



(A)	(A):
	(B)
 The Sun. Fuel. Gasoline. 	a. It is operated by electricity.b. Its light energy changes into chemical energy in plants.
1	 c. It is a liquid that can be used as fuel for cars. d. It is any substance that produces thermal energy when it is burned.
1	2

3.

3	Put (V) or (X):		
	 As the speed of a car increases, the amount of used fuel decreases. 	()
•	We must check the amount of gasoline in the fuel tank before making a trip by a car.	,)
	3. Both coal and wood produce energy when they are burned.	ì)
	4. Natural gas is a form of fuels that can be used in generating electrical energy.	. ()
4	Correct the underlined words :	in a second	100000
•	We need sound energy, for cooking food and warming houses.	iconette)
	2. Coal is the main source of most energies on the Earth's surface. (
	3. Fuel is the substance that produces electrical energy on burning. (
5	Write the scientific term of each of the following :		-
•	1. It is the main source of most forms of energy on the Earth's surface.		
	(******)
•	The form of energy that is produced as a result of burning wood and coal.		
	(******)
•	3. It is any substance which produces thermal energy on burning. ()
6	Complete the following sentences :		_
•	Gasoline is burned inside a car engine to produce energy that is		
Î	converted into energy which causes the movement of the car.		
0	Some forms of fuel can be used in cooking such as,, and		
	Coal, and can be used in electric power stations to ger electricity.	nera	ite
•	4. We can use some forms of fuel in warming houses such as and		
7	Give reasons for :		
	1. The fuel is very important for different means of transportation.		
0	2. Sometimes the fuel indicator of a car goes down.		

@Understand

Unit 3 | Concept

3. Gasoline is burned inside a car engine.

What happens to ...?

- 1. The car fuel indicator if the amount of gasoline in a car decreases.
- The car movement if fuel runs out in a car.

Dook at the opposite picture, then choose the correct answer:

- 1. Coal is a form of fuel, which is used in all the following purposes, except
 - a. cooking food.
 - b. operating cars.
 - c. generating electricity.
 - d. warming houses.
- 2. Coal is burned to produce
 - a. thermal energy.
 - c. natural gas.

- b. sound energy.
- d. wood of trees.
- 3. Coal and are used in warming houses.
 - a. water

b. plastic

c. sand

d. wood



Burning coal

Activity 4 Types of Fuel

► Choose the correct answer from those between brackets:

1. From the fuels that are used in cooking food is

(oil - natural gas)

2. From the fuels that are used in generating electricity is

(coal - wood)

In the previous lesson, you have learned that fuels are substances that, when burned, they release thermal energy.

Types of fuel:

▶ Types of fuel can be classified into:

Biofuels



2 Fossil fuels

1. Biofuels

Biofuels:

They are fuels made from living organisms that can be planted (i.e., plants).

Examples:



 Wood is the oldest fuel that is still used all around the world.



- Charcoal is made from wood and it is an important fuel.



 Some types of plants such as grass, corn and wood chips can be used to make a liquid fuel.

- · Biofuels are renewable fuels which means that they can be continually renewed as plants grow.
- · Although biofuels are renewable energy resources, they should be conserved, where :

Using wood as fuel requires cutting down trees.

Cutting down trees at a faster rate than they can grow leads to "deforestation", which has negative effects on the environment.

Therefore, we should conserve using wood, so that it will not run out.

V Note

Many trees grow a few centimeters each year, while some trees reach their full height in a period nearly equals the human's lifetime. This means that the growth of these trees takes more than one human's lifetime to complete their growth.

biofuels grass

wood chips

liquid fuel الوقود الحيوى

require العشب lifetime رقائق الخشب charcoal وقود سائل

com بحتاج renewable عمر الإنسان continually الفحم النباتي

deforestation الذرة negative متجدد

إزالة الغابات

59

2. Fossil fuels

Fossil fuels :

They are fuels formed from the remains of plants and animals that were buried and decomposed over a long period of time.

Examples:



- Oil and natural gas were formed from the decomposition of the remains of ancient sea animals.



- Coal was formed from the decomposition of the remains of ancient plants.

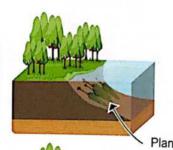


Gasoline is a fuel made from oil.

 Fossil fuels are nonrenewable fuels which means that they are gone and cannot be easily renewed.

Formation of coal:

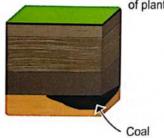
Millions of years ago, large areas of the Earth were covered in swamps, with a lot of plants growing nearby.



When those plants died, their remains were decomposed and covered by hundreds of meters of mud and rocks.

> Remains of plants

Due to the effect of the Earth's heat and pressure, those remains were turned into coal.



form bury ancient

swamps pressure remains

 decompose nonrenewable mud

Millions of years

Fossil fuels (coal, oil and natural gas) take millions of years to be formed, so they
are used faster than they are formed.



The original source of energy in biofuels and fossil fuels is the light energy of the Sun.



Check your understanding

Complete the following table using the words below:

(living organisms — grass — renewable — oil — corn — nonrenewable — gasoline — millions of years)

Points of comparison	Biofuel	Fossil fuel
Definition :	Fuel made from that can be planted.	Fuel made from the remains of living organisms, that takes to be formed under certain conditions.
Renewable or nonrenewable :		
Examples :	Wood, and	Natural gas, coal,and

Optional Digital Activity

Activity "Fossil Fuels" in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

Activity 6 Oil and Water

Oil and water are two types of resources that humans can use to generate energy.

Formation of oil:

 Oil comes from deep in the ground, where oil formed from the decomposition of sea creatures, as follows:

When the sea creatures died, their remains settled on the sea floor.

Over millions of years, layers of sediments and rocks covered the remains of those sea creatures. These layers pressed down causing extreme heat and pressure.

Over time, as a result of extreme heat and pressure, those remains converted into **oil**.

► The following table shows some differences between oil and water and how to conserve each of them:

Oil	Water
Oil is a nonrenewable energy resource. Nonrenewable resource:	Water is a renewable energy resource Renewable resource:
It is a natural material that is used faster than it can be replaced.	It is a natural material that can be replaced soon after it is used.
 Conservation of oil: Oil is used at a rate faster than the formation of new oil, so it should be conserved by many ways such as: Reducing the use of private vehicles. Using of public means of transportation. 	 Conservation of water: Water may not be replaced as quickly as we need it, so people should use water carefully to conserve it by many ways such as: Avoid wasting or polluting water. Growing plants that do not need large amounts of water for irrigation.

In the Assessment Book: Try to answer: Self-Assessment 6

Exercises on Lesson 2

Understa	and OAp	bla	Analyze	Evaluate	● Create
Choo	se the correct an	swer :			
English .	the following are f		excent		
a. v	vood.	b. natural gas	c. gasolir	ne, d.	glass.
2	is considered a				-
a. 0	Sasoline	b. The Sun	c. Natura		The moon
. 3. All	the following are				,
a. r	atural gas.	b. water.	c. the Su		vind.
4. No	renewable resou	rces of energ	y take to b	e formed.	
a. a	short period of ti	me		long period of t	ime
1	ew minutes		d. few ho		
	ient people used	as a fu	el before discove	ering gasoline.	
		o. water	c. wind	d. w	vood
	od is considered a				
			c. liquid fu		
	al was formed und	ler the Earth's			
	ead animals.		b. dead p		
	ead humans.		d. dead in		
1	eme heat and pre	essure under	the Earth's surfa	ce nas an impo	ortant role in
1	ning vood.	o. wind.	c. fossil fu	iel d.b	iofuel.
		, wind.	0. 10001110		
Choos	e from column (B) what suits i	t in column (A) :		
	(A)	Spanie park	(B)		And the Control
1. Wa	ter.		extreme heat an		e formed
1	nd energy.	1	ains of dead pla		Forth's
3. Coa	al.	surface.	nain resource of	energy on the	Laitiis
		c. It is a gas	seous renewable	e resource of e	nergy.
		d. It is a liqu	uid renewable re	source of energ	gy.
1		H			1

2.

1.

3.

• Understand

3	Put (v') or (x):	
	1 District is an extraordische resources of ellery.	(
	Extreme cooling under the Earth's surface helps in the formation of	oil. (
	Water and gasoline are two renewable resources of energy.	(
	Water and gasoline are two renewals. We have to reduce the usage of the Sun as a source of energy.	(
	5. The rate of usage of oil is slower than its rate of formation under	,
Ĭ	the Earth's surface.	(
	6. The Sun is the main source of forming both biofuel and fossil fuel.	(
•	7. We can make a liquid fuel from grass and wood chips.	(
4	Correct the underlined words :	
•	 We have to increase planting vegetables and fruits that need 	
deten	a large amount of water.	(
1	2. In houses, gasoline is used in cooking food as it is one of the oldest	t
	known biofuels.	(
	3. The nonrenewable resources of energy take a short period of time	
-	to be formed under the Earth's surface.	(
-	4. The moon is the main source of both biofuel and fossil fuel.	(
	5. We can use some animals to make a liquid biofuel.	(
-	6. The rate of usage of fossil fuels must be increased.	(
	7. Wood is a form of fossil fuels that can be used in houses.	(
	8. Water is a nonrenewable resource of energy that can be used	
1	as a fuel in cooking food and moving cars.	(
-	9. We can conserve oil by increasing the use of private vehicles.	(
E	Write the scientific term of each of the following :	
	1. Natural resources of energy, that take a short period of time to be re	enewed.
Š		(
•	2. Natural resources of energy that take a very long period of time	
	to be formed.	(
•	3. It is a form of biofuel that can be made from some types of plants	
And the same	such as grass and wood chips.	(
	4. They are fuels that were formed from remains of dead animals	
1	and plants under the Earth's surface.	(
•	5. It is a form of fossil fuel that was formed from remains of dead plan	
	under the effect of extreme heat and pressure.	(
•	6. It is a form of fossil fuel that was formed from dead marine animals.	. (

L	Complete the following sentences :
	1. Water and are considered from
-	coal and are from nonrenewable resources of energy.
1	The natural resources that can be replaced shortly after being used are called resources of energy.
	The natural resources that are consumed at a rate faster than they can be renewed are called resources of energy.
-	4. Different forms of fuel can be classified into two main types which are
- Charles	5. The type of fuel that is produced from living organisms that can be planted is called such as wood and
	6. Wood and are examples of biofuel, while and are examples of fossil fuel.
	7. Wood chips and grass can be used to make a biofuel.
Salar and Column 2 is not as a	8. Oil formed from the decomposition of as a result of extreme heat and
5	Give reasons for :
7	Water and wind are considered as renewable resources of energy.
	2. Coal and gasoline are considered as nonrenewable resources of energy.
-	
	3. Using wood of trees as a fuel has negative effects on the environment.
- SANTON CONTRACTOR OF THE PARTY OF THE PART	
- SANTON CONTRACTOR OF THE PARTY OF THE PART	What happens if?
- SANTON CONTRACTOR OF THE PARTY OF THE PART	
- SANTON CONTRACTOR OF THE PARTY OF THE PART	What happens if?

Arrange the following steps to know how fossil fuel is formed:

The remains of marine living organisms were buried and decomposed under sediments and rocks.

> Remains of marine living organisms



Due to the effect of extreme heat and pressure, the remains of marine living organisms were turned into oil or natural gas.

Oil or natural gas



The death of marine living organisms that have lived since ancient times.

> Dead marine living organisms



marine

formation بحرية

Activity 8 Living Without Electricity

- You have learned that fossil fuels such as natural gas and oil are nonrenewable energy resources which are used in generating electricity.
 - Recently, renewable energy resources such as wind and water (hydropower) are also used to generate electricity.
- Whatever the resource of energy is renewable or nonrenewable, we should conserve the energy through many ways such as :
 - Turning off lights when they are not needed.



Unplugging electrical devices (appliances) when they are not used.



- Imagine the electric current being cut off while you were studying, you can use simple ways to keep studying, like:
 - 1. Using candles instead of the electric lamps.
 - 2. Writing with a pen and paper instead of using a computer.
- So, we can conclude that electrical energy is very important in our lives and we should conserve it.

Check your understanding

▶ Look at the following pictures, then put [✓] in front of the picture showing how to conserve electricity:





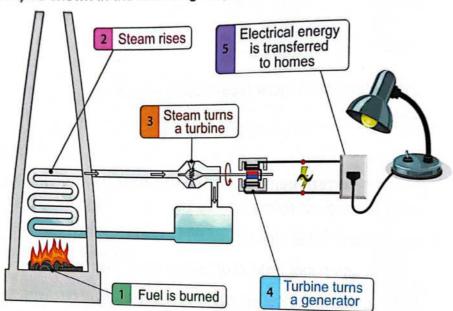


Using Fossil Fuels to Generate Electricity Activity [9]

- As you knew from the previous lessons that fossil fuels have many uses such as :
 - Using gasoline and natural gas to operate cars.
 - Using oil, coal and natural gas to generate electricity.
- Now, we will study how fossil fuel can be used to generate electricity, which is use to light homes.

How fossil fuel is used to produce electricity:

To generate electricity, fossil fuel is burned in the electric power station (power plant) as shown in the following steps:



1) Fuel is burned

When fuel is burned, it produces thermal energy.

Steam rises

This thermal energy is used to heat water to make steam.

Steam turns a turbine

The steam is directed through pipes and used to turn a device

power plant steam

68

turbine محطة توليد الكهرباء rise بخار

pipe توربين يرتفع

4 Turbine turns a generator

- The movement of the turbine produces kinetic energy, which is used to operate a generator.
- When the generator is turned on, it converts the kinetic energy into electrical energy.

5 Electrical energy is transferred to homes

Finally, the electrical energy is transferred through wires to homes to operate different devices.

Check your understanding

- Complete the following sentences:
 - 1. When fossil fuel is burned, it produces energy.
 - 2. In the electric power stations, the thermal energy that is produced from burning fossil fuel is used to heat water to form
 - 3. In the electric power stations, there is a device known as that is used to convert the kinetic energy into electrical energy.

In the Assessment Book:

Try to answer: Self-Assessment (7)

69

wires مُولد

Exercises on Lesson 3

e Analyze

O CLES

OApply

Choose the correct answer:

1. Remains of living organisms that were buried under the Earth's surface are

- affected by to form fossil fuels.
 - a. low pressure and high temperature
 - b. high pressure and low temperature
 - c. low pressure and low temperature
 - d. high pressure and high temperature
- a. nigh pressure and night temporate role in the formation of fossil fuels
 - except

b. extreme heat.

a. extreme pressure.

d. rocks and sediment.

- c. strong wind.
- 3. All forms of fossil fuel are formed
 - a. above the Earth's surface.
 - b. under the Earth's surface.
 - c. above the water surface.
 - d. in the air around us.
- 4. All the following are forms of fossil fuels, except
 - a. water.

b. coal.

c. natural gas.

- d. oil.
- 5. The steps of forming fossil fuel don't include of the remains of the living organisms.
 - a. decaying

b. cooling

c. burying

- d. heating
- 6. We can use the energy that is produced from to generate electrical energy.
 - a. renewable resources only
 - b. nonrenewable resources only
 - c. renewable and nonrenewable resources
 - d. food including fruits and vegetables
- 7. All the following actions don't conserve electrical energy, except a. unplugging unused electrical appliances.

 - b. plugging many unused electrical appliances.
 - c. turning on all the house lights all the day long. d. leaving the television turned on all the day long.

70

•	8. All the following can be a, oil.	used to generate electrical energy, except	********	
	c. water.	b. natural gas.		
	Mark Collin Statement Co.	d. glass.		
•	9. Inside the electric power	r station, heating of produces steam.		
	a. turbines	b. generators		
	c. water	d. fuel		
Ę	Choose from column (B)	what suits it in column (A) :		
	(A)	(B)		
	Rocks and sediments Water	a. is a liquid fossil fuel, that is used to proceed electricity.	luce	
	3. Oil	b. is a liquid biofuel, that is used to produce energy in houses.	e therma	
		c. is a liquid in electric power station that p	roduces	
-		steam on heating which turns turbines.		
		d. play an important role in the formation of fuel.	f fossil	
40000	1	2		
F	Put (✓) or (x) :			
		must be formed under the Earth's surface.	,	,
-			()
- 4		al can be used to produce electrical energy. e do not need is a way to conserve electricit	, (, ,)
		side electric power station produces	у. ()
7	kinetic energy.	nas sissais ponei siaasii produces	(١
		erator in an electric power station produces		,
	potential energy.	are are are are are power of all on produced)
	6. We have to conserve al	I forms of fuel.	ì)
4	Correct the underlined w			
-	 Fossil fuels include oil, 	coal and <u>wood</u> .	()
	2. After death of living orga	anisms, their remains are buried under		
	the Earth's surface and	exposed to extreme pressure and cool.	(
-	3. Water is a nonrenewable	e energy resource.	()
-	4. In an electric power state	tion, water turns turbines that produce kinet	ic energy.	,
			()
-	5. The movement of gene	rator in the electric power station changes		
	kinetic energy into pote	ntial energy.	()

Understand

Analyze

 3. The matter that product electric power station. 4. The device in the electric power station, that converts kinetic energy into electrical energy. 	rbines in (
Complete the following sentences: 1. In electric power station, we use fossil fuels such as oil and natural grants are considered as resources of energy. 2. Water is considered as resource of energy, and we can use	e it to
 generate	energy to
Give reasons for : 1. Generators are important in electric power stations. 2. We must turn off lights that we do not need.	
What happens to?	
A generator that is connected to a damaged turbine in an electric pover	wer station.
The movement of the turbine if the water in an electric power station heated.	is not

0	Look at the opposite sixty			
۲	Look at the opposite picture, then choos studying of how electric power stations	e the correct answer according to	you	ır
Ĭ				
	To generate electricity inside electric power need to the fuel.	wer station,	1)
Ì	a. cool	1110		1
-	b. mix water with			**
-	c. burn		1	7
ì	d. mix sand with	Langi	¥,*	
-		Electric power st	ation	
1	Steam in electric power station is produa. heating water.	1 2 C C C C C C C C C C C C C C C C C C		
Ì	c. cooling water.	b. mixing water with fuel.		
-		d. cooling fuel.		,
Design to	On generating electricity inside electric energy which is produced from burning	power stations, is the first ty	/pe o	ΣŤ
-	a. electrical energy	b. thermal energy		
-	c. potential energy	d. kinetic energy		
-	4. The generator in electric power station		ener	αv
- sylletic	a. electrical – kinetic	b. electrical – thermal	31101	93.
and the same	c. thermal – electrical	d. kinetic – electrical		
and distance	5. The movement of turbines produces			
at constant to	a. kinetic	b. potential		
Carried Sections	c. chemical	d. hydropower		
Consessor.				
1	Put (\checkmark) in front of sentences which desc	ribe conservation of electricity:		
0	 Turn off lights you do not need. 		()
der Specialist	2. Let electrical devices work all the time.		()
- Company	3. Use energy-saving light bulbs.		()
minerette.	4. Leave television turned on all the day lo	ong.	()
-				_
1	Arrange the following steps to show how	w electricity is generated in electi	IC	
-	power station and sent it to houses and	tactories :		
************	() Steam turns the turbine that produc	es kinetic energy.		
	() Fuel is burned and produces therm	al energy.		
-	() Electrical energy is sent to houses	and factories.		
	() Water becomes hot and produces s	team.		
-	() Water becomes not and production (duces electrical energy.		
	() Turbine turns the generator that pro	5000		

LESSON

Activity 🔟 **Big City Environmental Concerns**

▶ Put (✓) in front of the picture that shows environmental pollution :







In this activity, we will study that fossil fuels have negative impacts in big cities where the increase of people's needs and their industrial and agricultural activities cause pollution problems around the world.

Some causes of pollution in big cities



 Smog produced from burning of fuels pollutes the air.



2. Pesticides used in farms can be carried into water in canals and rivers when rain falls, this leads to pollution of soil and water.



Chemicals used in man factories pollute the air and also the nearby water and soil.

Some effects (impacts) of air pollution on human's health:

- 1. Smog from cars causes irritation of human's eyes and lungs.
- 2. Scientists have found that smog is full of small particles that the human breathes in, these particles irritate the lungs, causing the damage of tissues of the respiratory system.



Check your understanding

- Complete the following sentences:
- 1. Smog from cars causes irritation of human's and and
- 2. Burning fuel produces, which pollutes the

concerns impact

smog

canal مخاوف/مشكلات

irritation تأثير damage الضباب الدخاني

industrial قناة agricultural تھیے

pesticides

chemicals صناعية particles زراعية tissues مبیدات حشریة

Activity III

Burning Fossil Fuels and Pollution

- You have learned that burning fossil fuels to generate electrical energy pollutes
- People need energy to operate trains, cars, ships and even more energy is needed to supply houses, schools and factories with electricity.
- · To get this energy, people use fossil fuels, where :
- Coal, oil or natural gas are burned in electric power stations and the energy produced from burning fuel is used to generate electricity.
- Then, the generated electricity is transferred to different places through electric wires.



Harms of burning fossil fuels on the environment :

Although burning fuel is used to generate electricity, but it makes pollution, where burning coal and oil produces carbon dioxide gas which causes:



Acid rain

Global warming

Carbon dioxide gas can combine with water in the air to form acid rain that leads to:

- The death of trees.
- The change in the chemical nature of lakes and kill fish.
- The change in the chemical nature of soil.
- Dissolving some rocks including the rocks used for building.

Increasing the amount of carbon dioxide gas in the air forms a layer in the atmosphere that traps heat on Earth causing a slow rise in the Earth's temperature, which is known as global warming.

harm
change
lakes
building

How to reduce acid rain and global warming:

The best solution to reduce acid rain and global warming is to $\mathsf{conse_{r_{v_{\varrho}}}}$ energy, where:

- As we reduce our usage of energy, the amount of burning fossil fuel to generate energy decreases.
- As the amount of burning fossil fuel decreases, the amount of carbon dioxide and other pollutants in the air, which we breathe in, will decrease.



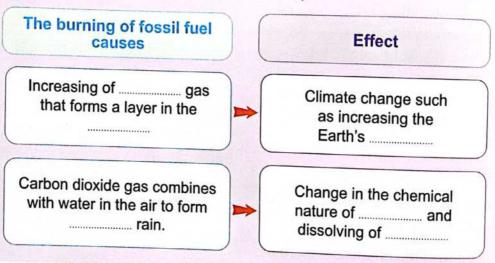
Conserving energy not only reduces pollution but also conserves nonrenewable f_{OSS} fuels and keeps the Earth clean.

| | | | | |

Check your understanding

"Fossil fuels cause air and water pollution".
Based on this statement, complete the following sentences using the words below:

(temperature – lakes – atmosphere – carbon dioxide – rocks – acid)



In the Assessment Book: Try to answer: Self-Assessment 8

Exercises on Lesson 4

Understand Apply Analyze Evaluate 🚹 Choose the correct answer : 1. Air pollution is usually caused due to of fuel. a. cooling b. warming c. freezing d. burning 2. To decrease the pollution in a city to its lowest limit, we have to build a factory a. that uses oil, inside the city. b. that uses coal, inside the city. c. that uses natural gas, outside the city. d. that uses coal, outside the city. 3. Smog causes irritation of of humans. a. stomach and eyes b. eyes and lungs c. small intestine d. large intestine 4. Smog contains tiny particles that a. damage the tissue of human respiratory system. b. damage the tissue of human digestive system. c. help the human body grow up. d. keep the human body healthy. 5. To reduce pollution with smog, we have to operate cars by a. gasoline or natural gas. b. gasoline or electricity. c. electricity or natural gas. d. gasoline or coal. 6. Acid rain is formed when combines with rain water. b. carbon dioxide gas a. oxygen gas d. sand c. dust 7. All the following are harmful effects of acid rain, except

a. global warming.b. death of trees.

c. change in the chemical nature of lakes.

d. change in the chemical nature of the soil.

• Create

Choose from column (5)	hat suits it in column (A) . (B)	
	a. It is a liquid that is considered as ren	ewabl
(A)	a It is a liquid that is consider	
	resource of energy.	ration o
1. Acid rain.	h It is a gas that is he	
	living organisms. c. It is a gas that causes trapping heat	on Ear
2. Carbon dioxide gas.	and that cause	
	d. It is a gas the when it increases in air. d. It is formed when carbon dioxide gas	comb
3. Water.	d. It is formed when carbon and	
	with water in the air.	
2	3	
1		
Put (/) or (X):	ssue damage in the human respiratory system	n.
 Smog doesn't cause any ti 	ssue darriage in the har	
Acid rain causes soil and	Water political	
3 Global warming can disso	olve some rocks.	
4. The heat trapped on Eart	h causes global warming.	
- + : I - : - halma troop to SI	urvive.	
6. To reduce pollution and c	conserve nonrenewable resources of energy	/,
0. 10 100000	SP	
we must decrease their u		
we must decrease their u		
Write the scientific term of	f each of the following :	
Write the scientific term of	f each of the following: ich the Earth's temperature increases,	,
Write the scientific term of 1. It is a phenomenon in wh when carbon dioxide gas	f each of the following: ich the Earth's temperature increases, increases in the air.	(
Write the scientific term of 1. It is a phenomenon in wh when carbon dioxide gas	f each of the following: ich the Earth's temperature increases, increases in the air.	
Write the scientific term of 1. It is a phenomenon in wh when carbon dioxide gas	f each of the following: ich the Earth's temperature increases, increases in the air. an body whose tissues are damaged due	(
Write the scientific term of 1. It is a phenomenon in who when carbon dioxide gas 2. It is a system in the huma to breathing a big amount	f each of the following: ich the Earth's temperature increases, increases in the air. an body whose tissues are damaged due t of smog.	
Write the scientific term of 1. It is a phenomenon in who when carbon dioxide gas 2. It is a system in the huma to breathing a big amount	f each of the following: ich the Earth's temperature increases, increases in the air. an body whose tissues are damaged due	
Write the scientific term of 1. It is a phenomenon in who when carbon dioxide gas 2. It is a system in the huma to breathing a big amount 3. It is a type of rain that is forwith water in the air.	f each of the following: ich the Earth's temperature increases, increases in the air. in body whose tissues are damaged due t of smog. formed when carbon dioxide gas combines	(
Write the scientific term of 1. It is a phenomenon in who when carbon dioxide gas 2. It is a system in the huma to breathing a big amount 3. It is a type of rain that is for with water in the air. Complete the following ser	f each of the following: ich the Earth's temperature increases, increases in the air. in body whose tissues are damaged due t of smog. formed when carbon dioxide gas combines	(
Write the scientific term of 1. It is a phenomenon in who when carbon dioxide gas 2. It is a system in the huma to breathing a big amount 3. It is a type of rain that is for with water in the air. Complete the following ser 1. When pesticides mix with and	f each of the following: ich the Earth's temperature increases, increases in the air. in body whose tissues are damaged due it of smog. formed when carbon dioxide gas combines intences: water in canals, this causes the pollution of	((
Write the scientific term of 1. It is a phenomenon in who when carbon dioxide gas 2. It is a system in the huma to breathing a big amount 3. It is a type of rain that is for with water in the air. Complete the following ser 1. When pesticides mix with and	f each of the following: ich the Earth's temperature increases, increases in the air. in body whose tissues are damaged due t of smog. formed when carbon dioxide gas combines intences:	((

-	3, Smog leads to pollution that causes irritation of and
	4. Tiny particles found inlead to air pollution that causes tissue damage of the humansystem.
	5. Burning coal and oil produces gas, which combines with in air forming acid in
	6. Increasing the burning of fossil fuel produces more gas that causes pollution.
•	7. Acid rain leads to change in the chemical nature of lakes causing death of
Con- Constitution of the last	Burning coal and oil produces gas which forms a layer in the atmosphere causing rise in the Earth's temperature in a phenomenon known as
Section and sections	9. The change in the chemical nature of due to rain leads to the death of trees.
6	Give reasons for :
•	4. Smart of care in very department to human health
-	Smog of cars is very dangerous to human health.
0	
	2. Farmers must decrease the use of pesticides. 3. Increase the burning of fossil fuel causes acid rain.
The second secon	2. Farmers must decrease the use of pesticides.
The second secon	2. Farmers must decrease the use of pesticides. 3. Increase the burning of fossil fuel causes acid rain.

What happens if ...?

- Pesticides mix with water of canals and rivers.
- Factories decrease their use of chemicals.
- 3. Acid rain falls on buildings for a long period of time.
- People decrease burning fossil fuels.
- Look at the following graph that describes the percentage of smog in four different cities during one month, then choose the correct answer:
 - People in city number have the highest percentage of eyes' diseases.
 - a. (1)
- b. ②
- c. (3)
- d. 4
- 2. City number has the least percentage of air pollution.
 - a. (1)
- b. ②
- c. (3)
- d. (4)
- 3. City number is the most one that needs to change the type of fuel to decrease the air pollution in it.
 - a. (1)
- b. 2
- c. (3)
- d. 4

smog

City

1

City

2

City

(4)

3

Cities

40

30

20

10

- 4. People suffer from respiratory system diseases in city number are less than those in city number ①.
 - a. (1)
- b. ②
- c. ③
- d. **4**



Activity 12 Conserving Fossil Fuels

▶ put (✔) or (X):

- 1. Fossil fuel is used in cooking food.
- 2. Fossil fuel is used in generating electricity to light houses.
- You have learned that how fossil fuels are burned to generate electricity that lights our houses, so we should conserve this type of fuel, where:
 - . There is a limited amount of fossil fuels available on the Earth.
 - Fossil fuels are formed over millions of years, this means that fossil fuels cannot be replaced as quickly as we use them.
 - Fossil fuels will run out from the Earth, if we don't reduce using fossil fuels.

Some ways to conserve fossil fuels



1. Walking or using bicycles instead of driving a car.



2. Turning off the lights when you are not in the room.



Replacing fossil fuels with renewable energy resources such as: water, wind and solar energy.

Disadvantages of using fossil fuels to produce energy:

- When some forms of fossil fuels are burned, they release gases that cause :
 - Air pollution.
 - Trap heat in the atmosphere causing "global warming" which raises the temperature of Earth and changes its climate.

♥ Note

Using renewable energy resources instead of fossil fuels means that renewable energy resources will not run out, so this will not cause an increase in Earth's temperature but it costs more money to produce energy from renewable resources than from fossil fuels.

climate بكلف cost محدود limited 81 متاح available مساوئ disadvantages



Check your understanding

- ▶ Put (√) or (x):
 - 1. The amount of fossil fuel on Earth is unlimited.
 - Producing energy from renewable resources costs less money than producing energy from fossil fuels.
 - 3. Using cars instead of bicycles is a way to conserve fossil fuels.
 - 4. The gases released from burning fossil fuels pollute the environment.



Optional Digital Activity

Activity 13 " Value of Renewable Resources " in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

Activity 14 Using Fuels

- In the previous lessons, you have learned about types of fuels, their forms and their uses, and you also have learned that different forms of fuels can be classified as renewable or nonrenewable energy resources.
- Now, classify the following renewable energy resources and nonrenewable energy resources in the following table using the words below:

(Coal – Gasoline – Oil – Solar energy – Water – Natural gas – Wind energy – Wood)

Renewable energy resources	Nonrenewable energy resources
Charcoal (is made from wood)	

Give reasons for:

Water is considered as a renewable energy resource.
 Because it can be replaced shorty after being used.

2. Coal is considered as a nonrenewable energy resource.

Because it is used at a rate faster than it can be renewed.

In the Assessment Book:
Try to answer:
Self-Assessment 9

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Exercises on Lesson 5

Understand

OApply

d. produce thermal energy on burning.

Analyze

Evaluate

O Creat

	Choose the correct answer: 1. We must fossil fuel at first, to obtain a. wash b. cook c. c. 2. Fossil fuels need to be formed under a. five years b. to c. hundreds of years d. n	energy. ool d. burn the Earth's surface. en years hillions of years
Control of the Contro	 3. Among the following resources, we must con a. solar energy and coal. b. solar energy and wind energy. c. wind energy and oil. d. oil and coal. 	
O AND DESCRIPTION OF THE PARTY	 4. To conserve fossil fuels, we have to do all the a. replacing gasoline with natural gas. b. replacing gasoline with solar energy. c. replacing natural gas with solar energy. d. replacing coal with wind energy. 	
O THE RESERVE AND THE PROPERTY OF THE PROPERTY	 5. Burning fossil fuel produces gases that	
-	6. All the following energy resources cause increase the Earth, except	easing the temperature of
And the state of the second se	 a. solar energy. b. coal. c. oil 7. All the following sentences are related to the ga. changing the Earth's climate. b. trapping heat in the atmosphere. c. decreasing the Earth's temperature. d. increasing the Earth's temperature. 	d. wood. global warming, <u>except</u>
O manufacture and a second	8. Both coal and charcoal a. are renewable resources of energy. b. are nonrenewable resources of energy. c. are examples of biofuel.	

Choose from column (B) what suits it in column (A):

(A)
(B)

1. Wood.
2. Coal.
3. Wind energy.

a. It is a renewable resource of energy that doesn't pollute the air.
b. It is a biofuel that is used in warming houses.
c. It is a biofuel that is produced from corn.

	burned.	ssil fuel that pollutes the air when it is	
1	2	3	

Ì			
×	Put (🗸) or (X) :		
	1. The amount of oil on the Earth is limited.	()
•	2. Fossil fuels that human made from corn can be replaced as quickly		
	as it is used.	()
	3. When burning fossil fuels increases, the temperature on Earth decreases.	()
•	4. As a result of global warming, the temperature on the Earth increases.	()
(5. The use of fossil fuels to produce energy costs more money than using		
	renewable resources.	()
(6. Wind energy will run out faster than natural gas.	()
•	7. To conserve fossil fuels, we have to replace them with renewable resource	es	
	of energy.	()
	8. Global warming is one of the bad effects of using fossil fuels to produce		
	energy.	()
4	Correct the underlined words :		
•	1. The amount of renewable resources of energy are limited on Earth. ()
	2. The amount of biofuels cannot be replaced as quickly as it is used. ()
	3. Gases released from burning fossil fuels always clear the air. ()
	4. Burning all types of fuels causes global warming. ()
	5. Nonrenewable resources of energy will not run out as they are used. ()
	6. Wood is a fossil fuel that is used in warming houses. ()
	7. Gases released from fossil fuels on burning decrease the temperature		
	on Earth.)

VVI	ite the scientific term of each of the following:
· 1	The type of fuels that when burned, it produces gases which pollute
	ho air
2 .	The increase of the temperature on the Earth, as a result of burning
	anall fuels
3. 1	The energy resources that include wind energy, water and solar energy. (
Co	mplete the following sentences:
•	To conserve fossil fuels, we can replace them with renewable resources of energy such as water, and
2, 0	Global warming causes the raise of on Earth and changes its
3. V	when fossil fuel is burned, it releases that cause air pollution and the course air pollution are air pollution air pollutio
4. I	people do not conserve using of fuels, they will run out on Earth
5. L	Using the resources of energy costs more money than using fossil fu
6. T	o avoid air pollution, we must use resources of energy such as
	, solar energy and energy.
	e reasons for : ossil fuels cannot be replaced as quickly as they are used.
2. I	o keep the air clean, we must replace fossil fuels with renewable resources nergy.
 Wha	at happens to?
1. T	ne amount of foodil for the
	he amount of fossil fuels if people don't conserve their usage.
	ne Earth's temperature if we use renewable resources of energy instead of

ĺ	Give one example for each of the following :
1	1. A renewable resource of energy :
	2. A nonrenewable resource of energy :
	3. A method of conserving fossil fuels :
	4. A disadvantage of using fossil fuels to produce energy :
	5. An advantage of using renewable resources to produce energy :
	The different forms of fossil fuels are considered as resources of energy on
Ų	Earth that have some disadvantages.
	Choose the correct answer :
	1. If we don't conserve using fossil fuels, their amount will
	a. not change on the Earth. b. increase on the Earth.
	c. be constant on the Earth. d. run out on the Earth.
	2. To conserve fossil fuels, we must do all the following actions, except
	a. using energy-saving light bulbs.
	b. using fossil fuels more than solar energy.
	c. using bikes more than cars.
	 d. using renewable resources of energy more than fossil fuels.
	3. Fossil fuels are characterized by all the following except
	a. they have limited amount.
	b. they produce thermal energy on burning.
	c. they are renewable resources of energy.
	d. they are nonrenewable resources of energy.
	4. All the following resources are considered nonrenewable resources of energy
	except
	a. charcoal. b. natural gas. c. coal. d. oil.
	the contract of the contract o





Activity 15 Record Evidence Like A Scientist

	tupos of fuels, their for
Lagra	d a lot about some types of the state, and toring
In this concept, you have learne	d a lot about some types of fuels, their form

- Now, try to think like a scientist by writing your claim, your evidence and your
- scientific explanation about one of the main points of this concept through the four steps you have learned in the previous concepts.

Step 2	My Claim	
		•

Step 3	My Evidence	
		*
•••••		
	My Scientific Explanatio	n J
	My Scientific Explanatio	<u>n</u>
	My Scientific Explanatio	<u>n</u>
Step 4	My Scientific Explanatio	<u>n</u>
	My Scientific Explanatio	n]
	My Scientific Explanatio	n J



Optional Digital Activity

Activity 16 "Oil Drillers and Underwater Robots" in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

claim

scientific explanation

driller تفسير علمي

evidence فرضية

دليل

حفار

Activity Review : About Fuels

We can summarize this concept in the following main points:

 Fuel is one of the most important resources of energy that humans depend on to get energy.

Fuel:

It is any substance that produces thermal energy when it is burned.

- · Fuel is used for several purposes, such as :
 - Coal and wood which are used in :
 - · Cooking food.
- · Warming.
- Gasoline and natural gas which are used in :
 - · Generating electricity.
 - Operating all means of transportation.

Types of fuels

Biofuels:

They are fuels made from living organisms that can be planted.

Examples:

Wood

- Charcoal (is made from wood).
- Some types of plants such as grass, corn and wood chips can be used to make a liquid fuel.
- Biofuels are renewable fuels which means that they can be continually renewed as plants grow.

Fossil fuels:

They are fuels formed from the remains of plants and animals that were buried and decomposed over a long period of time.

Examples:

- Oil and natural gas were formed from the decomposition of the remains of ancient sea animals.
- Coal was formed from the decompositions of the remains of ancient plants.
- Fossil fuels are nonrenewable fuels which means that they are gone and cannot be easily renewed.

Formation of coal:

1. Millions of years ago, large areas of the Earth were covered in swamps, with a log of plants growing nearby.

2. When those plants died, their remains were decomposed and covered by hundred

of meters of mud and rocks.

3. Due to the effect of the Earth's heat and pressure, those remains were turned into

coal. • The original source of energy in biofuels and fossil fuels is the light energy of the ς_{U_h}

Oil comes from deep in the ground, where oil formed from the decomposition of $s_{\theta_{\theta}}$

1. When the marine creatures died, their remains settled on the ocean floor.

2. Over millions of years, layers of sediments and rocks covered the remains of those sea creatures. These layers pressed down causing extreme heat and pressure.

3. Over time, as a result of extreme heat and pressure, those remains converted into oil.

▶ The following table shows some differences between oil and water and how to conserve each of them.

Oil	Water
Oil is a nonrenewable energy resource. Nonrenewable resource:	Water is a renewable energy resource. Renewable resource:
It is a natural material that is used faster than it can be replaced.	It is a natural material that can be replaced soon after it is used.
 Conservation of oil: Oil is used at a rate faster than the formation of new oil, so it should be conserved by many was such as: Reducing the use of private vehicles. Using of public means of transportation. 	 Conservation of water: Water may not be replaced as quickly as we need it, so people should use water carefully to conserve it by many ways such as: - Avoid wasting or polluting water. - Growing plants that do not need large amounts of water for irrigation.

- Whatever the resource of energy is renewable or nonrenewable, we should conserve the energy through many ways such as :
 - 1. Turning off lights when they are not needed.
 - 2. Unplugging electrical appliances when they are not used.

How fossil fuel is used to produce electricity

- 1. When fuel is burned, it produces thermal energy.
- 2. This thermal energy is used to heat water to make steam.
- 3. The steam is directed through pipes and used to turn a device called "turbine".
- The movement of the turbine produces kinetic energy, which is used to operate a generator.
 - When the generator is turned on, it converts the kinetic energy into electrical energy.
- Finally, the electrical energy is transferred through wires to homes to operate different devices.

Some causes of pollution in big cities

- 1. Smog produced from burning of fuels pollutes the air.
- Pesticides used in farms can be carried into water in canals and rivers when rain falls, this leads to pollution of soil and water.
- 3. Chemicals used in many factories pollute the air and also the nearby water and soil.

Some effects of air pollution on human's health

- 1. Smog from cars causes irritation of human's eyes and lungs.
- Scientists have found that smog is full of small particles that the human breathes in, these particles irritate the lungs, causing the damage of tissues of the respiratory system.
- · Burning of coal and oil produces carbon dioxide gas which causes :

1. Acid rain	2. Global warming
Carbon dioxide gas can combine with water in the air to form acid rain that leads to: - The death of trees. - The change in the chemical nature of lakes and kill fish. - The change in the chemical nature of soil. - Dissolving some rocks including the rocks used for building.	Increasing the amount of carbon dioxide gas in the air forms a layer in the atmosphere that traps heat on Earth causing a slow rise in the Earth's temperature, which is known as global warming.

Some ways to conserve fossil fuels

Walking or using bicycles instead of driving a car.

Turning off the lights when you are not in the room.

 Replacing fossil fuels with renewable energy resources such as water, wind and solar energy.

In the Assessment Book:

Try to answer:

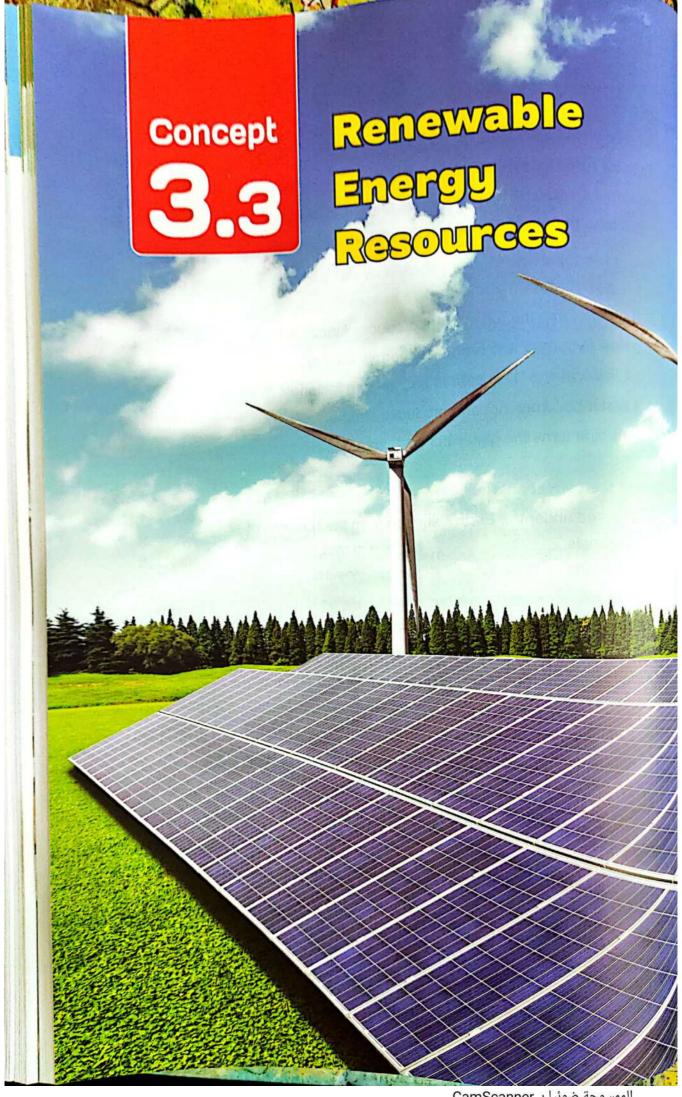
Model Exam on Concepts (3.1) & (3.2)

Model Exam on Concept (3.2)

(A) Complete the fol 1. Some forms of fue and	I can be used in cooking	anaray la		
and				
3. Using the resources of energy costs more money than using foss fuels. 4. Different forms of fuel can be classified into two main types which are				
(A)	(B)	Miss.		
1. Water.	a. It needs extreme heat and pressure t	to be formed		
2. Wind energy. from remains of dead plants.				
Wind energy.	from remains of dead plants.			
 Wind energy. Coal. 	from remains of dead plants. b. It is the main resource of energy on to surface.	he Earth's		
	b. It is the main resource of energy on t	f energy.		
	b. It is the main resource of energy on to surface.c. It is a gaseous renewable resource of energy on the surface.	f energy.		
3. Coal. 1	b. It is the main resource of energy on to surface. c. It is a gaseous renewable resource of d. It is a liquid renewable resource of energy. 2	f energy.		
Coal. 1 A) Correct the under the first the matter th	b. It is the main resource of energy on to surface. c. It is a gaseous renewable resource of d. It is a liquid renewable resource of energy on the surface. 2	f energy. nergy.		
1	b. It is the main resource of energy on to surface. c. It is a gaseous renewable resource of d. It is a liquid renewable resource of energy. 2	f energy. nergy. (5m		
1	b. It is the main resource of energy on to surface. c. It is a gaseous renewable resource of d. It is a liquid renewable resource of energy. 2	f energy. nergy. (
1	b. It is the main resource of energy on to surface. c. It is a gaseous renewable resource of d. It is a liquid renewable resource of energy. 2	f energy. nergy. (
3. Coal. 1	b. It is the main resource of energy on to surface. c. It is a gaseous renewable resource of d. It is a liquid renewable resource of energy. 2	f energy. nergy. (51) ((

Total h

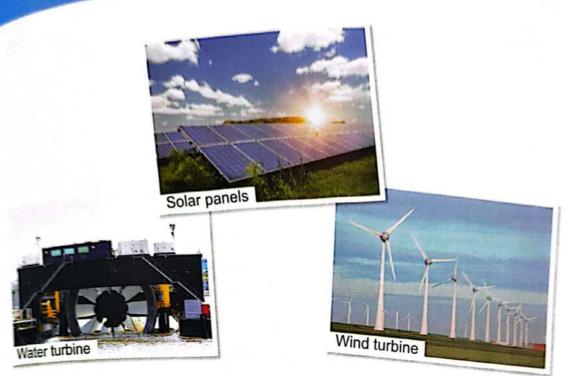
3	(A) Put (✓) or (X) :	(5 m	arks)
	1. Wind energy will run out faster than natural gas.	()
	2. Turning off lights that we do not need is a way to conserve electricity.	()
	3. We can make liquid biofuel from wood chips and grass.	()
	4. As the speed of the car increases, the amount of used fuel decreases.	Ò)
	 (B) Arrange the following steps to show how electricity is generated in electric power station and sent it to houses and factories: () Steam turns the turbine that produces kinetic energy. () Fuel is burned and produces thermal energy. () Electrical energy is sent to houses and factories. () Water becomes hot and produces steam. () Turbine turns the generator that produces electrical energy. 		
4	(A) Choose the correct answer :	(5 ma	arks)
	1. Coal is formed under the Earth's surface from the remains of		
	a. dead animals. b. dead plants.		
	c. dead humans. d. dead insects.		
	2. Among the following resources, we must conserve		
	a. solar energy and coal.b. solar energy and wind energy.		
	c. wind energy and oil. d. oil and coal.		
	3. All the following are found deeply under the Earth's surface, except		
	a. natural gas. b. coal.		
	c. green plants. d. oil.		
	4. All the following are used to generate electrical energy, except	r.	
	a. oil. b. natural gas.		
	c. water. d. glass.		
	(B) Give a reason for the following :		
	Cutting trees to obtain wood has negative effects on the environment.		
		•••••	
		••••••	







Activity 1 Can You Explain?



In the previous concept, you have learned that the renewable energy means that it does not run out faster than we use.

What are the different ways we can use renewable energy to generate electricity?

- From the previous pictures, we notice some examples of renewable energy resources which are solar energy (sunlight), wind and water.
- · Electricity can be generated using the previous renewable energy resources in different ways, where:
 - Solar panels use solar energy to generate electricity which is used to light streets.
 - Wind turbines generate electricity by using the kinetic energy of wind.
 - Water turbines generate electricity by using the kinetic energy of water.

In this concept, we will study:

- · Windmills and watermills.
- Renewable energy resources.
- The Sun and the use of solar energy.
- Ways to generate useful energy using the wind movement.
- Ways to generate electricity using the kinetic energy of water.

Activity Windmills and Watermills

▶ Put (✓) in front of the device that generates electricity :







· Manual mixer.

· Water turbines.

Wind turbines.

 You know that most of the devices around us require electricity to be powered, but how did humans powered machines hundreds of years ago before electricity?

Windmills and watermills:

- Hundreds of years ago, people needed machines to make their lives easier, for example, they used windmills and watermills which helped them to grind gran to make flour.
- The following table shows the advantages, disadvantages and energy used in windmills and watermills:

Points of comparison	Windmills	Watermills
Energy used :	The wind movement generates kinetic energy which moves the mills' blades, then kinetic energy transfer to other parts of the mills to crush the grain.	The water movement generates kinetic energy which moves the mills' blades, then kinetic energy transfer to other parts of the mills to crust the grain.
Advantages :	Low cost.Renewable energy resource.	 Low cost. Renewable energy resource.
Disadvantages :	Sometimes the wind does not blow, so the windmills do not move, so they are unable to do their job.	The water supply may dry up, so the watermills do not move, so they are unable to do their job.

devices الجهزة power الجهزة machines crush ويطحن grain عدوب blow supply المداد devices



Old windmills

- They use wind as an energy resource.
- . They have openings in their blades.
- . They have more blades than those of the modern wind turbines.
- . They are shorter than the modern wind turbines.
- They are used in crushing grain.



Modern wind turbines

- They use wind as an energy resource.
- They don't have openings in their blades.
- · They have fewer blades than those of the old windmills.
- They are taller than the old windmills.
- They are used in generating electricity.



Old watermills

- They use the movement of water as an energy resource.
- They are used in crushing grain.



Modern water turbines

- They use the movement of water as an energy resource.
- They are used in generating electricity.



Check your understanding

▶ Put (√) or (x):

- 1. All mills depend on the kinetic energy of wind only in order to be operated. (
- 2. From the advantages of windmills and watermills is that they are low cost. (
- 3. The kinetic energy of water is responsible for the movement of windmills. (

In the Assessment Book: Try to answer: Self-Assessment (10)

openings

modern فتحات

flour

99 طحين/دقيق

Exercises	on Lesson
TAG. O.	• Evaluate

• Create

	Analyze	EAST
● Understand	And the second s	
1. All of the following are example a. fossil fuel. b. water a. Solar panels use solar energy houses. a. sound b. electrical a. kinetic b. solar a. kinetic b. solar a. shape. c. blades number.	to generate	ntial d. kinetic ves the windmill's blades. d. potential
 Put (//) or (X): 1. Wind turbines generate elect 2. Machines make our lives mode 3. The low cost of the energy use of using this energy. 4. Windmills can do their job all 5. Both wind movement and was 6. Both modern wind turbines and 7. All devices require energy to 	re easier. sed in watermills is f the time as wind ne ter flow have kinetic d old windmills are u	ver stops blowing.
Correct the underlined words		
1. Solar panels use sound ener		ricity. (
2. Water turbines generate elec	tricity by using the e	
Manual mixer depends on electric depends		The state of the s
Write the scientific term of ea	ch of the following	:
1. A mill that is turned by water	9	
2. A mill that is operated by win		((
3. The type of energy that is pr		Irbines to operate
different home devices.		(
100		(

	Ever cipat
_	Complete the following sentences:
-	In electric power stations, the burning coal produces energy to generate electricity, while wind turbines generate electricity by using the energy. The water flow has big at
•	2. The water flow has kinetic energy, which moves the of water turbines to transform this energy into energy.
•	3. Both and are used to crush grain to make flour hundreds of years
-	ago, but now we use them to generate
•	4. Although modern wind turbines and old windmills vary in shape, they all use
	energy to be powered.
6	Give a reason for the following :
•	Humans used windmills and watermills from hundreds of years ago.
and the same of	
7	What happens if?
	Wind doesn't blow in an area that contains many modern wind turbines.
	2. Sunlight falls on solar panels.
The same of the sa	
8	Complete the following energy chain by using the energies below.
	(You may use each word more than once):
10.0	(thermal – electrical – kinetic)
	Burning of coal produces converted into converted into converted converted into converted conver
	electric power stations.
	into that travels through wires to houses.

Wind blowing produces energy that moves the turbines of wind turbines.

101

To operate

Television.

- The Sun is the main source of energy on Earth as it provides us with light and heat • In this activity we are going to know how the energy of the Sun reaches us on Earth
- At night when the Sun is not visible in the sky, you can feel warm because;
- - The atmosphere absorbs the energy of the Sun.
 - Land and water on Earth's surface absorb the energy of the Sun, which causes a rise in the Earth's temperature.

- The energy coming from the Sun is called "solar energy", which contains light and thermal energies from the Sun.
- The solar energy that is produced by the Sun contains a type of energy called "radiant energy" or "radiation" which is found in the Sun rays.

Uses of solar energy:

Direct source of thermal energy

Solar energy can be used directly as a source of thermal energy when exposing yourself to the sun rays to feel warm.



Greenhouses

Greenhouses allow the entry of solar energy (especially radiant energy) that comes from the Sun, then this radiant energy is converted into thermal energy that warms the inside of the greenhouses, which helps farmers to plant the crops that only grow in warm climates.



Warming houses

Houses can be built in a way that enables the energy of the Sun to warm them by placing large windows on the walls that face the Sun for most of the day.



absorb exposing

crops

102

visible يمنص تعريض greenhouse

enables مرثی radiation صوبة زجاجية Elevi

Cooking food

- Where, convergent mirrors (concave mirrors) are used to collect and focus sun rays to heat metal pots and cook the food inside.
- Convergent (concave) mirrors are curved mirrors as shown in the opposite picture.



Heating water

Solar water heaters are made of panels made of black pipes can be placed on the roof of houses to heat the water when it passes through these pipes, then the heated water is stored in a water tank to be used later.





Check your understanding

Complete the following energy chains:

	energy	Converted into	energy	
	(From the Sun)		(In greenhouses)	
energy	Converted into	energy	Converted into	energy
(From the Sun)		(In solar panels)		(In lighting lamps)

Activity 4 Solar Energy

- You already know the source and uses of solar energy. Now, we will study how solar panels convert solar energy coming from the Sun into

electricity.

Solar panels:

Solar panels can be very small that they can supply only one light bulb with energy, or very large that they can supply buildings or cities with energy.

How do solar panels work?

 Solar panels are composed of many small solar cells.



Solar panels

- \bullet These cells capture solar energy (especially radiant energy) coming from the Sunand convert it directly into electrical energy.
- Solar panels are used to generate electricity.

Uses of electricity generated by solar panels:

- This electricity can be used directly to light the streets.
- This electricity is used to recharge some types of batteries, like some calculators with small solar cells.
- This electricity is used in houses to operate various electric devices.
- This electricity is used to operate irrigation equipment in some villages.



Calculator with small solar cells



Check your understanding

In the table below, classify the following energies in the solar panel system into input and output energy:

(Solar energy - Electrical energy)

Input energy	Output energy

In the Assessment Book: Try to answer: Self-Assessment (11)

composed 104 irrigation

capture يتكون villages

Exercises on Lesson 2

Understand

OApply

Analyze

Evaluate

Create

1	Choose the correct answer:	
	In the absence of sunlight, all the followers	Owing items will be pogatively affected
İ	except	owing items will be negatively anected,
	a. plants.	b. human.
ļ	c. rocks.	d. animals.
•	2. Solar water heater changes en	nergy into energy
	a. electrical – thermal	into energy.
	b. solar – sound	
	c. electrical – sound	
	d. solar – thermal	
	3. The two forms of energy that transfer	r from the Sun to the Earth in the form of
	waves are energy ande	nergy.
	a. electrical – light	b. sound – thermal
	c. thermal – chemical	d. light – thermal
•	4. When land and water areas on Earth a	bsorb the solar energy, the increases.
	a. temperature on Earth	
	b. speed of rotation of Earth	
-	c. speed of rotation of moon	
	d. speed of rotation of Sun	
•	5. The solar energy is converted into	energy in greenhouses.
	a. electrical	b. sound
	c. thermal	d. potential
	6. Greenhouses allow farmers to plant of	crops that only grow in
	a. polar climate.	b. warm climate.
	c. absence of sunlight.	d. absence of water.
	7. Using convergent sheets in co	oking food is one of the benefits of using
	the solar energy.	
	a. paper	b. plastic
	c. mirror	d. wooden
9	8. All the following are from the uses of	electricity generated by solar panels
	except	
	a. operating windmills.	 b. operating irrigation equipment.
	c. lighting streets.	 d. operating calculators.

	y) what suits it in column	(B)
(A) 1. Solar water heater 2. Light energy and thermal energy 3. Electrical energy	c. are the two main for	sed by wind turbines. e Sun to heat water in ho ms of energy produced from solar par
1	2	3
 Living organisms don' The Sun provides the Solar water heater is f 	t need the Sun to survive. Earth with light and heat. formed of panels made of long the walls that face the Sun to survive.	
F	OF OHE SHIAH SOIAL CEIL	
Correct the underlined	words :	sms cannot survive /
Correct the underlined to 1. In the absence of the I		
Correct the underlined of the last the absence of the last the control of the contro	words : light of <u>moon</u> , living organisound energy are produced	I from the Sun and
Correct the underlined of the last the absence of the last the control of the contro	words : light of <u>moon</u> , living organi	from the Sun and (oulb with <u>sound</u>
Correct the underlined of the last of the Earth. 3. Small solar panels are energy.	words: light of moon, living organisound energy are produced used to supply one light b	I from the Sun and (oulb with <u>sound</u> (
Correct the underlined of the last of the Earth. 3. Small solar panels are energy. Write the scientific term	words: light of moon, living organisound energy are produced used to supply one light b	from the Sun and (bulb with <u>sound</u> (
Correct the underlined of the last of the Earth. 3. Small solar panels are energy. Write the scientific term of the last of	words: light of moon, living organisound energy are produced used to supply one light be of each of the following is used to collect and focus of the food inside.	from the Sun and (oulb with <u>sound</u> (: s sunlight onto metal pots
Correct the underlined of the last of the Earth. 3. Small solar panels are energy. Write the scientific term 1. A type of mirrors that if to heat them and cook	words: light of moon, living organisound energy are produced used to supply one light be of each of the following is used to collect and focus of the food inside.	from the Sun and (oulb with <u>sound</u> (: s sunlight onto metal pots
Correct the underlined of the last of the Earth. 3. Small solar panels are energy. Write the scientific term of the last of	words: light of moon, living organisound energy are produced used to supply one light be not each of the following is used to collect and focus the food inside. bsorb the energy of the Su	from the Sun and (oulb with <u>sound</u> (: s sunlight onto metal pots
Correct the underlined of the last of the	words: light of moon, living organismound energy are produced used to supply one light be not each of the following is used to collect and focus the food inside. bsorb the energy of the Susentences:	I from the Sun and (oulb with sound (: s sunlight onto metal pots (un to generate electricity.
Correct the underlined of the last of the Earth. 3. Small solar panels are energy. Write the scientific term of the last of	words: light of moon, living organismound energy are produced used to supply one light be not each of the following is used to collect and focus the food inside. bsorb the energy of the Susentences: oduced from the, are arried by sun rays.	in to generate electricity. (
Correct the underlined of the last of the	words: light of moon, living organismound energy are produced used to supply one light be not each of the following is used to collect and focus the food inside. bsorb the energy of the Susentences: oduced from the, are arried by sun rays. bodies to the Sun, we feel	in to generate electricity. (
Correct the underlined of the last of the	words: light of moon, living organismound energy are produced used to supply one light be used to supply one light be used to collect and focus the food inside. bsorb the energy of the Susentences: oduced from the, are arried by sun rays. bodies to the Sun, we feel rgy in cooking by using contractions.	in to generate electricity. Indicate the sun and (

- 5. Solar cells that convert radiant energy coming from the sun rays into
- 7. In some villages, solar panels are used to generate energy that is used to operate equipment.

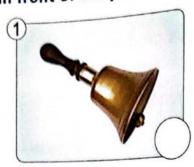
Give reasons for :

- 1. Sometimes the Sun is not visible in the sky but you can feel its warmth.
- 2. Some electrical devices have solar panels which are composed of many solar cells.

Complete the following table:

1.	Used energy	Produced energy
Solar panels	energy	energy
2. Wind turbines	Kinetic energy	energy
Solar water heater	Solar energy	energy

Put (V) in front of the pictures in which solar energy curred

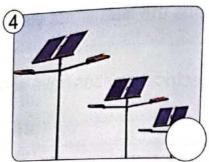


Bell





Greenhouse



Lamps with solar panels



Activity 5 Harness the Wind

put () next to the renewable energy resources :









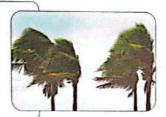
You have learned about the renewable energy resources such as the Sun, water and wind. Now, let's know how wind turbines convert kinetic energy of the wind into electricity.

Using energy of the wind:

Different amounts of solar energy (especially radiant energy) reach different regions of the world.



Radiant energy causes the air around the Earth to heat up to different degrees, where the difference in temperatures between cold and hot air causes air to move and wind to blow.



- Kinetic energy of the wind movement is used to rotate the blades of wind turbines.
- When the blades of wind turbines rotate, this causes the rotation of turbines and that leads to generating electrical energy.



This electrical energy is transmitted through big wires to different places such as houses and factories.



transmitted

harness يُنقل

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The following diagram shows the energy chain of the wind turbines:

Electrical Radiant Kinetic Converted Converted Thermal Converted into energy energy energy Into into energy (In power lines) (From the Sun) (In wind turbines) (causing temperatures vary between hot air and cold air)

Note

In wind turbines, when the kinetic energy of wind increases, the blades rotate faster, so the efficiency of wind turbines increases.

Check your understanding

▶ Put (√) or (x):

- Kinetic energy of the wind is converted into electrical energy by wind turbines.
- 2. Wind is a nonrenewable energy resource.
- 3. The difference in air temperatures around the Earth causes air to move and wind to blow.

Optional

Optional Digital Activity

Activity 6 "Building a Turbine" in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

In the Assessment Book: Try to answer: Self-Assessment (12)

Exercises on Lesson 3

 Understand O Apply Analyze Create Evaluate Choose the correct answer : 1. All the following are renewable energy resources, except a. waterfalls. b. coal. c. the Sun. d. wind. 2. Kinetic energy of movement is used to rotate the blades of wind turbines. a. the moon b. stars c. water d. wind 3. When the blades of wind turbines rotate, this causes their turbines to rotate that leads to generating energy. a. electrical b. solar c. chemical d. potential 4. The electrical energy is transmitted from wind turbines to houses through a. water. b. wind. c. coal. d. wires. 5. The electrical energy that is transmitted to houses can operate all the following devices, except b. manual mixer. a. washing machine. d. electric heater. c. electric fan. • 6. The change of energy in an is opposite to the change of energy in a wind turbine. b. electric heater a. electric bell d. electric fan c. electric iron 7. When energy of wind increases, the blades of wind turbines spin more quickly. b. potential a. kinetic d. solar c. chemical 2 Put (//) or (X): 1. Wind is a renewable energy resource. 2. There is a similarity in temperatures between cold and hot air. 3. In wind turbines, the kinetic energy is converted into chemical energy. 4. Electricity generated by wind turbines is transmitted through wind. 5. When air blows into the wind turbine with a small force, the blades spin slowly.(

111

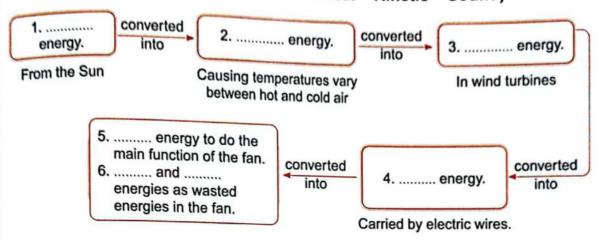
Understand

1. Pote 2. The 3. Wat 4. Whe 4. Whe 2. A tu 3. An e to h Comp 1. Win form 2. Win 3. The	ential energy of the difference in tential energy of the difference in tential energy of the difference in tential energy into the scientific tential movement ween cold and he rotation and factor discovered due to of rays.	mperatures be when their is the wind turb of each of of air that is ot air. The power of finerated from ries.	etween cold and all all all all all all all all all al	nd hot air cause as wind blows. e force, the bla g: the difference in enerate electric and is transmit	es air to stop. (
3. Wai 4. Whi 4. Whi 1. A na bet 2. A tu 3. An o to h Comp 1. Win form 2. Win 3. The	the scientific terestural movement ween cold and he roine that uses the energy that is genouses and factor lete the following d is formed due to of rays.	the wind turb of each of of air that is of air. he power of finerated from ries. of sentences to the effect of	the following resulted from lowing air to g wind turbines	g: the difference in the enerate electrical and is transmit	in temperatures
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Write 1. A na bets 2. A tu 3. An o to h Comp 1. Win form 2. Win 3. The	the scientific terestural movement ween cold and he roine that uses the energy that is genergy that is genergy that is formed due to for ays.	the wind turb rm of each of of air that is ot air. he power of f nerated from ries. ng sentences to the effect of	the following resulted from lowing air to gwind turbines	g : the difference i enerate electric and is transmit	n temperatures
1. A na between 2. A tu 3. An of to h Comp 1. Win form 2. Win 3. The	atural movement ween cold and hor rbine that uses the energy that is genergy that is genergy that factor lete the following dis formed due to of rays.	of air that is of air. he power of finerated from ries. ng sentences to the effect of	resulted from lowing air to g wind turbines	the difference in enerate electric and is transmit	(
2. A tu 3. An oto h Comp 1. Win form 2. Win 3. The	ween cold and horbine that uses the energy that is genergy that is genergy and factor lete the following dis formed due to of rays.	ot air. the power of finerated from ries. The sentences to the effect of	owing air to g wind turbines	enerate electric and is transmit	(
Comp 1. Win form 2. Win 3. The	energy that is gerouses and factor lete the following d is formed due to of rays.	nerated from ries. ng sentences to the effect o	wind turbines	and is transmit	city. (tted through wi
Comp 1. Win form 2. Win 3. The	lete the following d is formed due to of rays.	ng sentences to the effect o	:		tted through wi
1. Win form 2. Win 3. The	d is formed due to of rays. d blows due to the	to the effect o	: ofenerg	3. (5.	
1. Win form 2. Win 3. The	d is formed due to of rays. d blows due to the	to the effect o	of energ	19 <u>2</u> % 62%	
0. 1110	d blows due to the			y coming from t	the in the
0. 1110		e difference in	1 betwee	en the cold air a	nd the hot air
	ated by wind mov	es of wind turl rement.	oines is cause	d by ene	rgy that is
4. Whe	en wind turbines	rotate,	energy is con-	verted into	eneray
thar	that when wind	blows into it	ine with a larg	e force, its blac	des rotate
mor	eenergy.	ation of wind	turbine blades	s, the wind turb	ine generates
blad	en the ener les will	rgy of wind in	creases, the s	peed of rotation	n of turbine
Give a	reason for :				
Kinetic	energy of wind a	affects the sp	eed of wind to	alete e e	
		- -	u	rbine blades ro	tation.
				······································	••••••
What I	nappens if the ki	netic energy	of a will be		•••••
increas	nappens if the ki	- chergy	or a wind tha	t is applied on	the wind turbi

Complete the following energy chain of a fan using the words between brackets.

(You may use the same word more than once):

(Thermal – Radiant – Electrical – Kinetic – Sound)





▶ Put (✔) or (★):

- Water is considered as a renewable energy resource.
- 2. The flow of water can be used in generating electricity.
- You have known that wind can be used to generate electricity.
- Now, we will study how water can be used to generate electricity.

Falling water:

- Rivers flow downhill, and during this process the gravitational potential energy of water is converted into kinetic energy that helps water turbines rotate to generate electricity.
- Dams are built on rivers to control the water flow and increase the potential energy of water.
- There is a type of dams called hydroelectric dam which is used to generate electricity using the flow of water.
- How can electricity be generated from hydroelectric dams using water turbines?
 - A hydroelectric dam prevents the flow of river water, so the potential energy of water increases.



Hydroelectric dam

- When water is released, it flows through water turbines in the dam and the potential energy of water is converted into kinetic energy.
- The flow of falling water that has kinetic energy helps water turbines rotate that operate generators to generate electricity.
- This electricity is sent through long electric wires to the places where it is needed, and this type of electricity is called "hydroelectric energy" or

downhill 114 prevent

gravitational انحدار hydroelectric يمنع

جاذبية كهرومالي

Hydroelectric energy (hydroelectricity):

It is a type of electrical energy generated by water turbines in dams.

The following table shows the similarities and differences between the use of water and the use of wind to generate electricity:

The use of water to generate electricity	The use of wind to generate electricity
	erences
Water is used in places where dams are built on rivers.	Wind is used in places with strong winds.
Sim	nilarities
- Both of them are renewable energy re	esources.
Both of them use kinetic energy to op	erate turbines to generate electricity.

門門

A R

Check your understanding

- ► Complete the following sentences using the words below : (wind turbines – water turbines – hydroelectric energy)
 - 1. Water flows through in dams to generate electricity.
 - 2. The electrical energy generated by water turbines in dams is known as
- 3. In places with strong winds, are used to generate electricity.

In the Assessment Book:
Try to answer:
Self-Assessment 13

Exercises on Lesson 4

Analyze

• Create

Evaluate

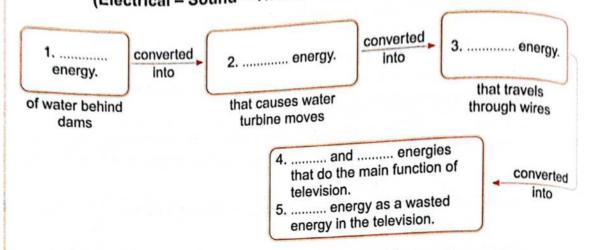
(Understand	OApply	• Analyze		
	Choose the co	rroct answer:			
	1 Water flavor	thereach turbings	in hydroelectric dams to generate	energ	у.
	a. electrical	through turbines	b. potential		
	c solar		d. light		
	2 In water turb	inos the	nergy of water is changed into electric	al energ	у.
	a. chemical	mes, me	b. kinetic		
	c. thermal		d. light		
		of flowing of river	water downhill is the force.		
	a. pushing	of flowing of five.	b. friction		
	c. gravitation	al	d. electrical		
			ectricity depends on places		
	a. with strong		b. where dams are built on	rivers.	
	c. with weak		d. where boats sail in rivers	s.	
	5. Both waterfa	lls and are	renewable energy resources.		
and a facility	a. wind		b. coal		
Section in section	c. oil		d. fossil fuel		
	D-1 (d) ((a)				
4	Put (✓) or (X) :				
-	1. Waterfalls are	e considered as r	nonrenewable energy resources.	()
•	2. Electrical ene	ergy can be gene	rated from both waterfalls and wind		
-	movement.			()
•	Dams are built	It on rivers to cor	ntrol the wind flow.	()
•	4. The flow of w	ater can be conti	rolled to generate electricity in dams.	,)
				,	,
6	Correct the und				
Managed Section and	 The thermal en hydroelectricit 	nergy generated y.	by water turbines in dams is known as		١
Contractor of the last	2. During the flo	wing of rivers wa	ter downhill, the chemical potential ene	(]
STREET, STREET,	water is conve	erted into kinetic	Onorau.		١
Calomidal Sec	3. Dams are buil	t on rivers in ord		(
Correction on	4. The electrical	energy is general	ated by wind turbines in dams.	(]
2		37 .0 9011016	wind turbines in dams	()

Write	the scientific term of each of the following:	
1. A tu	irbine that converts the energy of falling water into electrical ene	rav
1		
2. A ty	pe of electrical energy generated by water turbines in dams.	()
Comp	lete the following sentences:	
1. Wh	en rivers flow downhill,energy of water is converted into ergy that rotates water turbine.	
ene	ple build on rivers to control the water flow and increase in rgy that is converted into energy in water turbines that is ses.	its used to light
3. Dar wat	ns control the flow of that causes the increase of the	energy of
	type of electrical energy which is produced by water turbines is	5
	er and are from the renewable resources of energy which rgy to operate turbines and generate	n use
	can use a device known as wind to generate electricity in the strong air blows.	n places
	er turbines are used to generate electricity in places which have	e waterfalls
Give r	easons for :	
1. Hyd	roelectric dams are built on rivers.	
2. Wat	er turbines are placed in waterfalls areas.	
What	nappens if?	
	er turbines are placed in a dam.	
2. Pote	ential energy of water increases behind a dam that has water to	urbines.
*******	······································	11

Complete the following energy chain of a television by using the words between brackets:

OApply

(Electrical – Sound – Thermal – Potential – Light – Kinetic)



9 Complete the following table :

Points of comparison	Wind turbines	Water turbines
Energy used :	energy of wind.	energy of water
Type of used energy :	Renewable energy.	energy.
Produced energy :	energy.	energy.

LESSON

Activity 8 Modeling a Turbine Generator

Look at the opposite picture, then Put (✓) or (★):

- 1. The old watermills can generate electricity without turbines.
- 2. In a watermill, electricity cannot be generated when the flow of water is cut off.



Watermill

- You have learned how the energy of water movement is used to generate hydroelectric energy.
- Now, you will design a model of a water turbine.

Tools



Ball of white cork



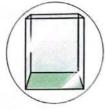
4 plastic spoons



Toothpick



3 wooden sticks



Bowl



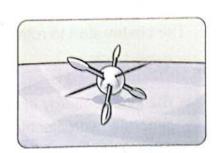
Jug



Wax gun

Steps

 Make the blades of the water turbine using the ball of cork, four plastic spoons and the toothpick as shown in the opposite figure.



bowl

model

toothpick

cork نموذج عود أسنان

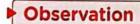
119

Unit 3 | Concept 3

- Make the base of water turbine by using the three wooden sticks and the wax gun as shown in the opposite figure.
- Fix the blades to the base as shown in the opposite figure.



Fill the jug with water, then pour it over the blades.



The blades rotate when water is poured over them and stop when the water inside the jug is completely run out.

6.When the water in the jug runs out, refill it with water from the bowl and pour water over the blades again.

Observation

The blades start to rotate again.

Conclusions

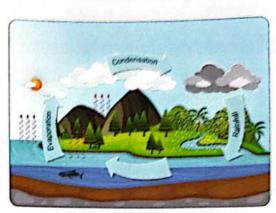
- The kinetic energy of moving water in rivers is used to rotate water turbines to generate hydroelectric energy.
- If the water flows all the time, the water turbines will be operated all the time.





Notes

- 1. In the previous activity, the water used to rotate the blades does not run out but it is renewed by filling the jug again which simulates what is happening on the Earth and known as the "water cycle" where :
 - The river's water does not return back to its source on its way through the dam but it flows into other bodies of water and evaporates, then condenses into clouds.
 - When rain falls from these clouds, the water returns again to the river.



The water cycle

2. Water is considered as a renewable resource of energy.

PIQIO

Check your understanding

▶ Put (√) or (x):

- Water is a nonrenewable resource that is used to generate hydroelectric energy.
- 2. In the water turbine, kinetic energy is converted into hydroelectric energy.

,

In the Assessment Book:

Try to answer:

Self-Assessment (14)

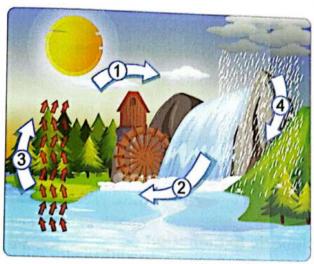


water cycle مصدر evaporate

clouds دورة المياة return يتبخر سحاب عود

4. Clouds are formed du 4. Clouds are formed du 5. In water turbines, the of electrical energy w	ue to the, then of water of rivers and seas energy of water movement is converted into a type
Give a reason for the for	ollowing :
Some dams contain wa	ter turbines.
20000000000000000000000000000000000000	
What happens if water the atmospheric air ?	of seas and rivers evaporates, then condenses in
une s	

Look at the following figure that represents the water cycle, then complete the sentences below:



- 1. The arrow number (...........) represents the evaporation of river's water.
- 2. The arrow number (............) represents the condensation of water vapour to form clouds.
- 3. The arrow number (...........) represents the falling of rain that make water return back to the river.
- 4. The arrow number (...........) represents the water movement in waterfall that makes the watermill rotate.





Activity P Record Evidence Like A Scientist

- In this concept, you have learnt a lot about renewable and nonrenewable energy resources and the benefits of using renewable energy resources.
- Now, try to think like a scientist by writing your claim, your evidence and your scientific explanation about one of the main points of this concept through the four steps you have learnt in the previous concepts.

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nce		
tific Explanat	ion	
	tific Explanat	

Activity 111 Review: Renewable Energy Resources

- We can summarize this concept with the following main points:
 - Hundreds of years ago, people needed machines to make their lives easier, so they used windmills and watermills to help them crush grain to make flour.
 - . The following table shows the energy used in windmills and watermills as well as the advantages and disadvantages of each:

points of comparison	Windmills	Watermills
Energy used :	Kinetic energy of wind.	Kinetic energy of water.
Advantages :	Low cost.Renewable energy resource.	Low cost. Renewable energy resource.
Disadvantages :	Sometimes the wind does not blow and the windmills do not move, so they are unable to do their job.	The water supply may dry up and the watermills do not move, so they are unable to do their job.

- The Sun is the main source of energy on Earth.
- The Sun provides us with light and heat.
- · Living organisms need the Sun to survive.
- The energy comes from the Sun is called "solar energy", which contains light and heat energies from the Sun.
- The solar energy that is produced by the Sun contains a type of energy called "radiant energy" (radiation) which is found in the Sun rays.

'Uses of solar energy:

Solar energy is a direct source of thermal energy when exposing yourself to the sun rays to feel warm.

- In greenhouses, radiant energy is converted into thermal energy which warms - In warming houses, by placing large windows on the walls that face the Sun for
- In cooking food, where convergent (concave) mirrors are used to collect and focus Sun rays to heat metal pots and cook the food inside.
- In heating water, where solar water heaters are made of panels that are made of black pipes can be placed on the roof of houses to heat the water.
- Solar panels are composed of many small solar cells that capture solar energy (especially radiant energy) and convert it into electrical energy.
- Uses of electricity generated by solar panels:
 - Light the streets.
 - Recharge some types of batteries, like some calculators with small solar cells.
 - Operate various electric devices in houses.
 - Operate irrigation equipment in some villages.
- The following diagram shows the energy chain of the wind turbines:

Electrical Converted Kinetic Thermal Converted Radiant Converted into energy into energy into energy energy (In power lines (In wind turbines) (From the Sun) (Causing temperatures vary between hot air and cold air)

- In wind turbines, when the kinetic energy of wind increases, the blades rotate faster, so the efficiency of wind turbine increases.

Water is used to generate electricity, as :

- Rivers flow downhill, the gravitational potential energy of water is converted into kinetic energy that helps rotate water turbines to generate electricity.
- Hydroelectric dams are built on rivers to control the flow of water and increase the potential energy of water to generate electricity.

Hydroelectric energy (hydroelectricity):

It is a type of electrical energy generated by water turbines in dams.

, The following table shows the similarities and differences between the use of water and the use of wind to generate electricity :

	The use of wind to generate electricity
Water is used in places where dams are built on rivers.	Wind is used in places with strong winds.
	larities sources. rate turbines to generate electricity.

. Water is a renewable energy resource, where :

- The river's water does not return back to its source on its way through the dam but it flows into other bodies of water and evaporates, then condenses into clouds.
- When rain falls from these clouds, the water returns again to the river and this is called the water cycle.

In the Assessment Book:
Try to answer:
Model Exam on Theme 3

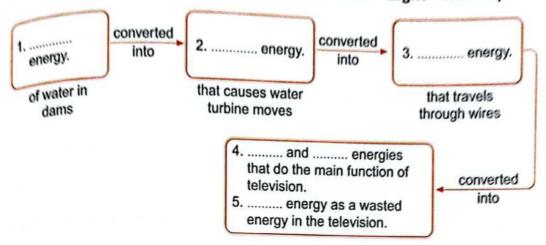
Model Exam on Concept (3.3)

	Total man
١	20

 (A) Write the scientific term of each of the following: The main energy which is produced from generators that are convater turbines and wind turbines. The main source of energy on Earth. A turbine that uses the power of blowing air to generate electricity. A turbine in which the kinetic energy of moving water is used to hydroelectricity. (B) Give a reason for the following: 	y. (
Hydroelectric dams are built on rivers.	
.,,	
(A) Correct the underlined words :	(5 marks
Thermal energy and sound energy are produced from the Sun a	and reach the
Earth.	(
2. When air blows into the wind turbine with a large force, the blad	les spin slower.
	()
3. Solar panels use sound energy to generate electricity.	()
4. During the flowing of river's water downhill, the chemical potential	(
water is converted into kinetic energy.	(
(B) What happens if?	
The presence of solar panels in some electrical devices.	
3 (A) Put (V) or (X):	(5 marks
 Both wind movement and water flow have kinetic energy. 	()
2. The Sun provides the Earth with light energy and thermal energy	y. ()
3. Wind is a renewable energy resource.	()
4. The flow of water can't be controlled to generate electricity in da	ms. ()

(B) Complete the following energy chain of a television by using the words between brackets :

(Electrical - Sound - Thermal - Potential - Light - Kinetic)



Take the same of				
(A)	Choose th	e corre	ect ansv	ver:

(5 marks)

- 1. In the water cycle, water, then it before falling in the form of rains.
 - a. freezes evaporates
- b. evaporates condenses
- c. evaporates freezes
- d. condenses evaporates
- 2. The solar energy is converted into energy in greenhouses.
 - a, electrical
- b. sound
- c. thermal
- d. potential
- 3. The reason of flowing of river water downhill is the force.
 - a. pushing
- b. friction
- c. gravitational
- d. electrical
- Some types of lamps in streets depend directly on as a renewable energy resource in order to do its function.
 - a. sunlight
- b. petrol
- c. coal
- d. natural gas

(B) Complete the following table:

Devices	Used energy	Produced energy
1. Solar panels	energy	energy
2. Wind turbines	Kinetic energy	energy
3. Solar water heater	Solar energy	energy

Assess Your Learning Questions of the School Book on Theme (3)

b. chemical energy.

d. light energy.

1. The unusable energy that produced from the electric lamp is the

•	Ch	005	
		008	

a. potential energy.

c. thermal energy.

2. Energy doesn't destroy, nor create from nothing, this indicates a. the draining of energy resources. b. conservation and transformation of energy. c. resources of energy are numerous. d. destroying the energy resources. 3. The produced energy from radio that reflects its main function is a. electrical energy. b. sound energy. c. light energy. d. chemical energy. 4. The idea of design and work of the robot that explores the surface of Mars depends on the idea of transforming a. electrical energy to kinetic energy. b. potential energy to electrical energy. c. light energy to electrical energy. d. kinetic energy to electrical energy. 5. One of your friends says that the local hydroelectric station creates electrical energy for your city. You know that energy can't be destroyed nor created from nothing, but changes from one form to another. Circle the statement that proves to your friend what you believe. a. There is a water tank behind the dam in most of the hydroelectric stations. b. Water is flowing from the hydroelectric station through numbers of tunnels of the dam. c. The kinetic energy of water leads to the movement of the turbine blades attached to a dynamo. d. The electric current flows from the hydroelectric stations to houses through huge wires.

6. In our daily life we use devices which depend on energy forms. Which of the

c. The function of television depends only on the hydroelectric energy. d. Cell phones depend on potential and kinetic energy for operation.

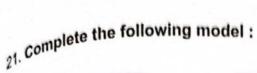
a. Computer depends on kinetic and electrical energy.

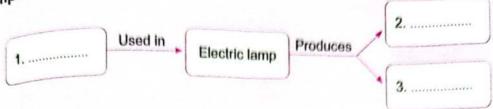
b. Ceiling fan depends on electrical energy.

following uses is true?

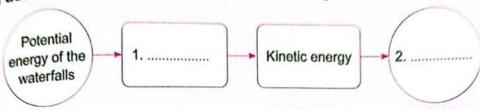
input energy used to con	trol the Mars exploration vehicle is
7. The input energy.	trol the Mars exploration vehicle isb. light energy.
a. electronic energy.	d machanian and
8. Energy is the ability to do work supporting it? a. The rotation of the turbine b. Heating water by the electrons are spring clothes using an electrons.	tk or make a change. Which of the following is NOT blades. The heater.
Turning on the electric inde	ge during the disruption of electric current.
g. Which of the following energy a. Thermal energy. Kinetic energy.	b. Light energy. d. Radiation energy.
10. Rearrange the following st	teps to describe how coal is formed. et old and died. () were decomposed and covered with sand clay layers. ()
c. Anciently, earth was contained. Several layers of clays and	ning with swamps where plants grow. () I sands were deposited on the remains of died plants. ()
e. The buried plants were cha	anged into coal due to the effect of heat and pressure.
· Choose:	
11. What is the reason for prefer instead of oil ?	ring the using of hydroelectric energy
 a. Oil is a source for renewab hydroelectric one. 	le energy and it is a cheap source compared with
b. Hydroelectric energy is a c	ostly source of energy compared with oil.
 c. Oil is a non-renewable southydroelectric one. 	rce of energy with high cost compared with
 d. Hydroelectric energy is a repollute the environment. 	enewable source of energy with high cost and doesn't
on fossil fuel. Which of the fo	es to have some procedures to reduce dependency ollowing procedures can help the city to achieve the
a. Providing money to constru	ict solar panels above houses.
c. Converting a new power p	lant working with coal to increase electricity production. a coal to use natural aas.
d. Converting government's v	ehicles that work with oil to use natural gas.

	tured and solar energies instead of coal and oil
The cause of preferring the use o	f wind and solar energies instead of coal and oil
in producing energy is	energies opposite to coar and oil.
a. Wind and solar energies are not	less expensive than coal and oil. Swable energies opposite to coal and oil.
b. Using wind and solar energies in	onnosite to coal and oil.
c. Wind and solar energies are ref	ewable energies opposite states and environment assource to generate
d. Wind and solar energies have to	ad natural resource to generate
14. Which of the following is a prefer	ed natural resource to 5
clean energy ?	b. Trees and dry herbs.
 Ocean and river water. 	d. Wind, oil, and natural gas.
 c. Water, coal, and oil. 	
15 are used in converting light	energy to electrical energy
 a. Wind turbines 	b. Water turbines
c. Solar panels	d. Windmills
16. The resource that we consume in	a rate faster than its formation in nature :
a. Wind.	b. Water.
c. Solar energy.	d. Fossil fuel.
17is a renewable source of er	nergy.
a. Coal b. Natural gases	
18. We can decrease the consumption	on of non-renewable sources of energy by using
a source of clean energy except t	
a. energy produced from water tur	bines.
b. energy produced from windmills	
c. solar panels that exist on the roo	ofo of houses
	ois oi nouses.
 d. energy produced from burning t 	
d. energy produced from burning b19. Energy produced from flowing was	penzene and natural gases.
19. Energy produced from flowing wa	penzene and natural gases. Her of waterfalls, dams and turbines
19. Energy produced from flowing was is called	benzene and natural gases. Iter of waterfalls, dams and turbines b. hydroelectric energy.
19. Energy produced from flowing was is called	benzene and natural gases. Iter of waterfalls, dams and turbines b. hydroelectric energy. d. kinetic energy.
 19. Energy produced from flowing was is called	benzene and natural gases. Iter of waterfalls, dams and turbines b. hydroelectric energy.
 19. Energy produced from flowing was is called	b. hydroelectric energy. d. kinetic energy. waterfalls is one of the renewable sources of
 19. Energy produced from flowing was is called	b. hydroelectric energy. d. kinetic energy. waterfalls is one of the renewable sources of
 19. Energy produced from flowing was is called	b. hydroelectric energy. d. kinetic energy. waterfalls is one of the renewable sources of the sand flowing into rivers repeatedly.
 19. Energy produced from flowing was is called	b. hydroelectric energy. d. kinetic energy. waterfalls is one of the renewable sources of es and flowing into rivers repeatedly. them after a period of time.



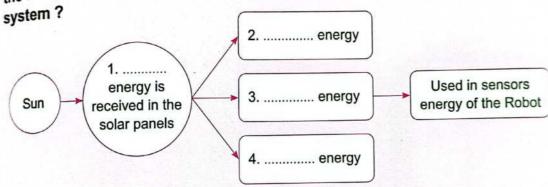


22. Complete the following model to describe the hydroelectric energy, and then determine the inputs and outputs of this system?



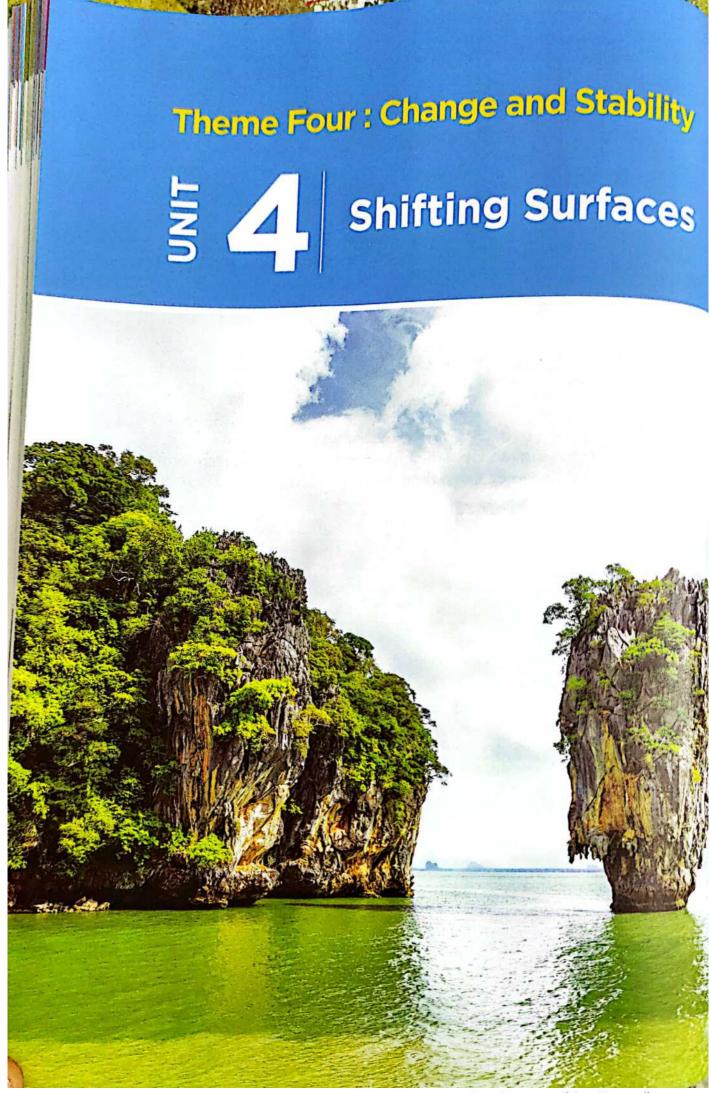
- 3. Inputs :
- 4. Outputs :

23. Complete the following model to describe the energy transformations in the Mars exploration vehicle, and determine the inputs and outputs of this



- 5. Inputs :
- 6. Outputs :
- 24. Draw a model showing the energy chain system when using solar panels to light the roads. Define the input and output energies.

- 1. System inputs :
- 2. System outputs :
- 3. What are the conversions of energy in this system?



الممسوحة ضوئيا بـ CamScanner

Get Started

What I Already Know

- There are many forces such as water and wind that shape the rocks on Earth's surface.
- Water and wind can break down rocks and move them from one place to another through two processes known as "weathering" and "erosion".
- . The opposite image shows a large canyon known as Wadi Nakhr in the country of Oman.
- In Wadi Nakhr, water, wind and other factors cause the different landforms there such as high peaks and also the cracks in the large rocks.



- How weathering and erosion shape the Earth's surface.
- The role of the following factors in weathering process:
- Water.

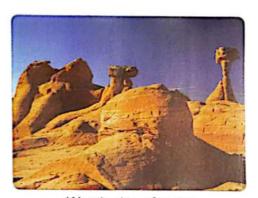
- Wind
- Plant roots.
- Acid rain.
- Oxygen gas in air.
- How deposition process helps in the formation of different landscapes on the Earth's surface.



*Forces that shape the Earth" At the end of this unit, you will make a research project to predict what factors (such as erosion, weathering, ... etc.) have an important role in shaping the different landforms of Wadi Nakhr over time.



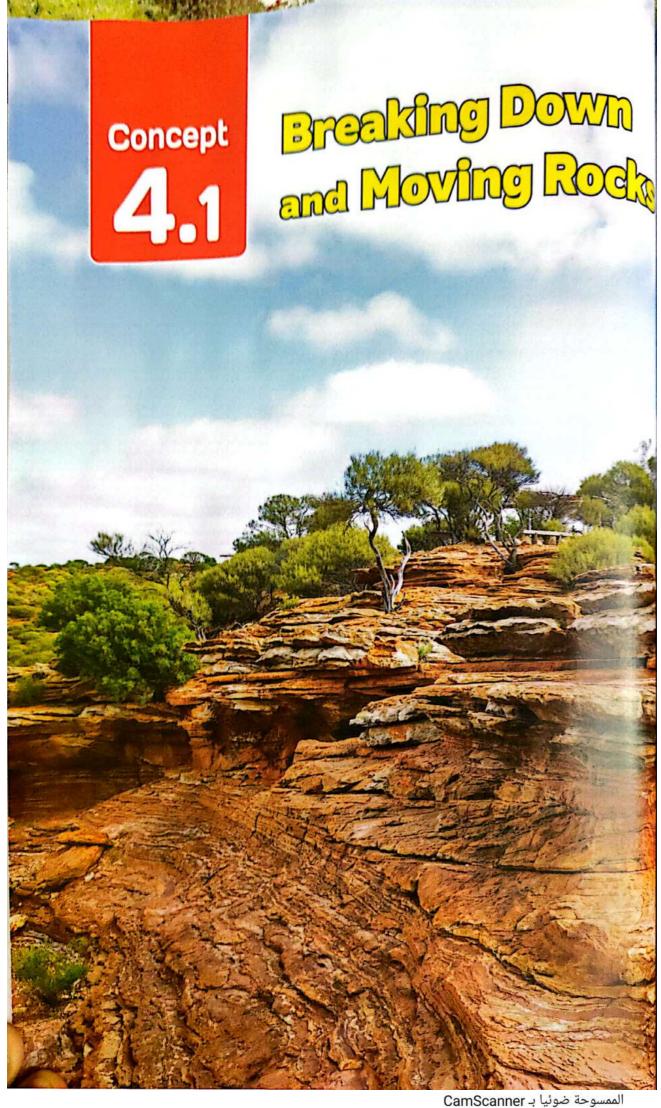
Wadi Nakhr



Weathering of rocks



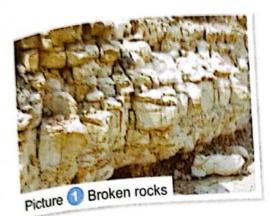
Wadi Nakhr

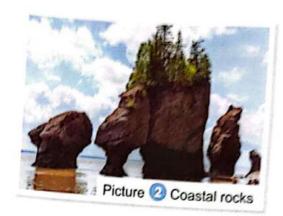






Activity Can You Explain?





The pictures above show some changes in the Earth's surface.

What are the factors changing the Earth's surface?

• The surface of the Earth is always changing due to the effect of the wind, water and weather changes.

Examples:

- As you see in picture ①, wind can break down rocks and can move the small particles of rocks from an area to another.
- As you see in picture ②, water can change the shape of rocks.

In this concept, we will study:

- Changing Earth's surface.
- Rocks and canyons.
- Weathering.
- Types of weathering.
- · Causes of weathering.
- · Erosion.
- Deposition.

factors break down landscape

canyon deposition تفتت مظاهر السطح particles

erosion اخدود weathering rocks

Activity 🔃

Disappearing Sandcastles

- Look at the opposite pictures, then put (√) or (x):
 - 1. The footprints still be there the next day. ()



The shape of the sandcastle still be there without changing till the next day.



)

Natural Erosion:

- If a child build a sandcastle on the sea beach, he may notice the disappearance of a part of it or all of it after few hours.
- Water and wind are some of the factors that can transport small rocks from one place to another forming a process known as "erosion".
- The disappearance of the sandcastle (erosion of the sandcastle) is due to the transportation of the sand particles from its place to another by the effect of water and this is considered as an example of natural erosion.

Notes

- Sand is formed by breaking down of some types of rocks into smaller particles.
- Forces of water and wind are responsible for the disappearance of sandcastles and erosion of coasts.





Check your understanding

- ▶ Put (√) or (x):
 - 1. The erosion of a sandcastle on a beach is considered as a natural erosion.
- 2. Rocks are formed by breaking down of sand.

()

sandcastles footprints natural erosion

notice فلاع رملية ontice اثار الأقدام disappearance تعرية طبيعية responsible for

coasts يلاحظ transport مسئول ع

سواحل الحل

Activity 📵

Sandcastles, Rocks and Canyons

The Earth's surface is continuously changing. Some changes can be very fast, other changes can be very slow that may take hundreds or millions of years.

Fast changes

. They are observed in a sandcastle.

It may completely disappear in few minutes as a result of its hitting by the sea waves.



Slow changes

- They are observed in a coastal rocks over time.
 - There may be some little difference in its shape after many years if some parts break off.

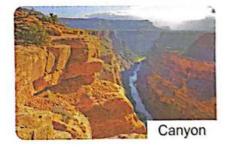


- In the previous pictures, we can observe some similarities between the sandcastle and coastal rocks:
 - 1. Both have steep needle-like parts.
 - 2. Both have sloping sides (inclined sides) at the bottom.
 - 3. Water and wind create their shapes.

Canyons:

They are deep valleys carved by flowing water.

- Canyons are formed due to the slow changes that happened to its rocks over many years.
- A canyon has needle-like parts and slopes at the sides, it is formed by the action of water.





Check your understanding

- ▶ Put (√) or (x):
- 1. The Earth's surface never change over time.

2. Wind and water can break down rocks into smaller particles.

()

In the Assessment Book:
Try to answer:
Self-Assessment (15)

hitting inclined sides needle-like

ضرب ضرب coastal rocks break off جوانب ماثلا slopes waves صخور ساحلية valley تنفصل carved انحدارات أمواج وادي منحوتة

271				
Choose	the	correct	answer	:

- 1. Rocks can be broken down into small particles by exposuring to all of the following, except d. water waves.
 - c. moon. rain water. b. wind.
- 2. Disappearing a part of a sandcastle due to the effect of sea waves means that all the following have changed, except d. its color. c. its size.
 - b. its volume. a. its shape. 3. Sand is formed due to breaking down of

 - d. plastic. c. rocks. a. glass. b. wood.
- 4. The deep narrow valley with slopes at its sides and often with water stream flowing through it is known as a
 - a. canyon.
- b. mountain.
- c. hill.
- d. river.
- 5. The force of wind plays an important role in erosion, because it can transfer
 - a. sound energy.

- b. light energy.
- c. small sized-particles of sand.
- d. very large pieces of rocks.
- 6. The formation of canyons takes
 - a. few minutes. b. few hours.
- c. few days.
- d. many years.

Choose from column (B) what suits it from column (A):

(A)	(B)
	a. are formed due to boiling of water.
1. Costal rocks.	b. can be made in few hours from sand particles on seashores.
2. Canyons.	c. deep valleys that are carved by flowing of water.
3. Sandcastle.	 d. are formed near seas over many years and have needle-like parts and sloping sides.

- 2.
- 3.

(X) or (X):			
put (//) or (X): 1. The surface of the Earth changes to the stream can break down rock	from time to time.	()
	ks into smaller pieces.	()
2. Water large particles of rocks are t	ks into smaller pieces. broken into smaller particles, they can	ı be	
3. When large particles of rocks are to	,	()
	ome the next day searching for your		
4. If you walk on the secure on the Forth	anged.	()
	n Surface take hundrede of years	()
	that are responsible for		
6. Water and with the erosion of sea coasts.		()
shanges that are observed in	the formation of a canyon are faster		
than that observed in the disappear	ardioc of a saffacastle.	()
Write the scientific term of each of	the following:		
1. The disappearance of a sandcastle	e as a result of its hitting with		
the sea waves.	(************)
2. They are deep valleys carved by fl)
a His a model that can be built on se	eashores using sand and may disappe	ear	,
easily by sea waves.		***************************************)
L. H. fallowing contanges h			_
	by using the words between brackets wind – water)	•	
Air moving from an area to anothe into smaller particles is known as	er and has a role in breaking down of r		
Study the following figures, then ch	noose the correct answers below:		_
	Figure (2)		
Figure (1)			
1. The force of water forms			
a. figure (1) only.	b. figure (2) only.		
c. figures (1) and (2).	d. neither figure (1) nor (2).		
- Water that affects the item in figure	e (1) is considered as an example of		
a. human-made changes.	b. artifical changes.		
c. fast changes.	d. slow changes.		

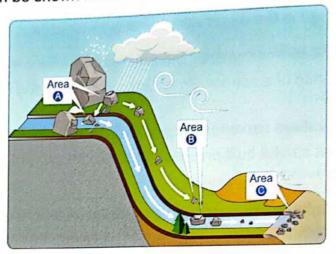


What Do You Already Know About Breaking Down and Moving Rocks

- Put (√) or (x):
- Erosion happens when the rocks get moved away by water or wind.
 - Sometimes erosion can happen very quickly.

Shaping the Earth:

In this activity, we are going to understand some processes through which the Earth's surface changes, these processes include weathering, erosion and deposition that can be shown in the following figure.



- From the previous figure we can observe that :
 - Area (3) shows the breaking down of large rocks into small particles (sediments), this process is known as "weathering".
 - Area 3 shows the movement of sediments from one place to another, this process is known as "erosion".
 - Area shows the dropping of sediments in a new place, this process is known as "deposition".

🤍 Note

Sediments could be sand, rocks or soil, and this depends on the environment in which the process takes place.

2	
一回	
1	
1-0	

Check your understanding

- ▶ Complete the following sentences :
 - 1. The process that is laying sediments down in a new place called
 - 2. The process in which rocks are broken down into smaller particles is known as

Activity 5 What is Weathering?

Weather and weathering:

weather is different from weathering, where :

Weather	Weathering
It is the condition of atmosphere at a specific time and place.	It is the breaking down of rocks on Earth's surface into smaller (tiny) pieces.
There are many factors affecting weather as temperature, wind, rains, ect.	There are many factors that cause weathering such as wind and water.
The condition of weather can help us to decide what to wear when we go outside.	· Weathering on shares the share of

You can see the effect of weathering in many observations around you such as :

Breaking of statues.



Removing of paints of buildings.



Pulling a wave to the sand of seashores.



Colder climate and ice are another factors that can change the landscape.



Check your understanding

Put	(V)	or	(Y)	
-----	-----	----	-----	--

- 1. Weather is the breaking down of rocks on Earth's surface into smaller
- 2. Weathering process effects on coastal area.

condition تماثيل all specific

seashore حالة weather محدد

atmosphere شاطئ البحر pulling طقس

145 سحب

Activity 6 Types of Weathering

There are two types of weathering which are "Mechanical weathering" and "Chemical weathering".

A. Mechanical weathering:

It is the breaking down of rocks due to the effect of physical factors like wind, water, plant roots and temperature.

1. The role of wind in mechanical weathering:

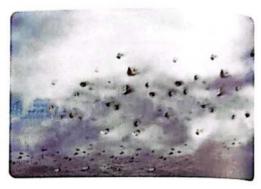
Wind pushes the sand from a place to another.



Friction occurs between sand and rocks.



Rocks are broken down.



2. The role of water in mechanical weathering:

Water runs over rocks.



Water dissolves some substances in rocks.



Rocks are broken down.



3. The role of plant roots in mechanical weathering :

Plant roots grow inside the cracks of rocks.



Cracks become wider.



Rocks are broken down.



mechanical chemical

dissolve میکانیکیة physical کیمیائیة friction تذوب pushes فبريائية

cracks احتكاك wider

شقوق أكتر انساقا

Notes

- 1. Weathering happens over long periods of time.
- It is hard to see weathering during its occurrence, but you can see its effects all around you in the little rocks, pebbles and sand that were parts of much larger rocks.

The role of temperature in mechanical weathering :

Water flows into the tiny cracks of rocks.



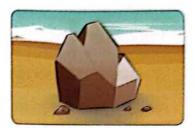
When the temperature gets very cold, water freezes forming ice that expands and makes the cracks of rocks become wider.

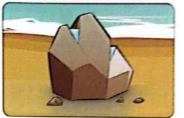


When the temperature increases, the ice melts, so water fills newly formed wide cracks again.

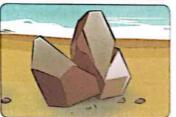


The cycle of freezing of water and melting of ice continues until rocks are broken down.









B. Chemical weathering:

It is the change of the structure of rocks due to chemical reactions.

Chemical weathering happens due to the chemical reactions of rocks with some other materials such as :

1. Oxygen.

2. Water.

3. Acid rain.

4. Acid produced by some living organisms.

The role of oxygen in chemical weathering: Oxygen of air reacts with iron of some rocks forming red-colored rust, this reaction can weaken rocks and break them down easily.

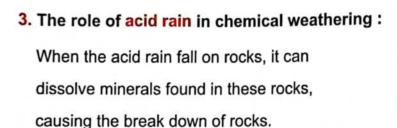


Red colored rust in rocks

2. The role of water in chemical weathering : When water dissolves minerals in a rock, the dissolved minerals combine

again forming new shapes as in

limestone caves.







4. The role of living organisms in chemical weathering :

Some tiny organism called "Lichens" produce acids on rocks that dissolve minerals found in these rocks and break them down.





Lichens is tiny plant-like organisms.



Optional Digital Activity

Activity "Forces That Shape Earth" in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

weaken rust iron

minerals بضعف limestone صدا combine

cave معادن lichens الحجر الجيري الأسنان (كاننان حية دقيقة تشبه النباتات)

Check your understanding Complete the following sentences using the words below: (acids - oxygen - mechanical - chemical)

1. Types of weathering can be classified into mechanical weathering and weathering.

2. Freezing of water inside cracks of rocks may cause a type of weathering known as weathering.

3. Chemical reaction between iron and causes its rusting.

4. Lichens produce that may cause breaking down of rocks.

In the Assessment Book:

Try to answer:

Self-Assessment (16)

CL			
Choose	the correct	answer	•

1	Choose the correct answer:	shange the E	Earth's surface, eva
•	Choose the correct answer: 1. All the following are processes that	it can change and	, oxcept
	a. digestion.c. weathering.2. The condition of atmosphere inclu	b. erosion.	
And a restraint the state of the second seco	a. weather. c. erosion.	b. weathering.d. deposition.	process.
	 4. When water freezes, it expands. T a. it will evaporates. c. its volume increases. 5. All the following are from causes of 	d. its volume dec	reases.
2	a. oxygen. b. water.	c. acid rains.	d. clouds.
-	 The dropping of sediments in a ne a. weathering. b. deposition. 	c. freezing.	d. erosion.
-		c. deposition.	
•	8. Limestone caves are formed due fa. dissolved minerals.c. living organisms.	to the combination b. red-colored rus d. acid rains.	
	9. Lichens produce on rock a. oxygen. b. acids.	c. water.	d. rain.
The second secon	a. mechanical weathering only. b. chemical weathering only. c. both mechanical and chemical d. neither mechanical nor chemical	weathering.	of the Earth.

A or (X):			
Put (V) or (X): Nind can be considered one of the factors that cause weathering.		()
1. Vi halp in the formation of rocks		()
2. plant roots help in the formation of rocks. 2. plant roots neip in the formation of rocks. 3. Limestone caves are formed by the action of mechanical weathering	,	()
3. Limestone caves are formed by the action of mechanical weathering 3. Limestone caves are formed by the action of mechanical weathering 4. Friction force between rocks and sand carried by wind may cause			,
4. Friction weathering.		()
in rocks rusts, the rock becomes more stronger.		()
AND THAILY LYDGO OF OCCURRENCE HAD BEEN TOURS AND SOIL		()
6. There are many of the first of sediments from one place to another is known as to the first of the first o	veat	heri	ng.
		()
8. Shaping the Earth is usualy start by deposition process.		()
Shaping and the shaping s	of	,	
acks.		()
Oxygen in air reacts with iron of some rocks forming green-colored ru	JST.	()
Write the scientific term of each of the following:			
1. Process in which rocks are broken down into smaller particles.	()
Process in which small broken rocks move from a place to another by the help of wind or water.	()
 Process in which the sediments are dropped in a new location by the action of wind, water and gravity. 	()
4. Part of plant grows inside cracks of rocks causing its weathering.	()
5. The condition of atmosphere at a specific time and place.	()
 It is a type of weathering through which acids of lichens dissolve minerals of rocks. 	(*********)
7. It is a type of caves that is formed when dissolved minerals of rocks combine again in new shapes.	()
8. It is a process through which water forming ice in cracks of rocks.	()
9. A gas in air combines with iron of some rocks and causes its weakne	SS.		,
	()

Understand

Complete the following sentences:
1. During process, rocks are broken down or weared away.
There are two types of weathering which areweathering and weathering.
 3. The type of weathering in which the rocks are broken down due to plant roots known asweathering.
 4. The type of weathering in which the structure of rocks changes due to chemical reactions is known as
 5. Some tiny plant-like organisms producethat can dissolve minerals of rocks causing its breaking down.
6. Shaping the Earth started by weathering, then and ends with deposition.
 7. Breaking a statue is an example of mechanical weathering, while rusting of an iron statue is an example ofweathering.
8. Lichens produce acids on rocks that dissolves its
Mechanical weathering takes place whenoccurs between sand carried by wind and rocks.
Give reasons for :
1. Iron in rocks may rust.
2. Water play an important role in the formation of limestone caves.
What happens if?
Lichens growing on rocks produce acids.
2 A mod - 1
2. A red-colored rust is formed on some rocks.

LESSON

Activity [3]

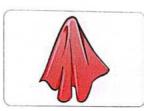
Modeling Mechanical and Chemical Weathering

- put (/) or (x): Nater plays an important role in both mechanical and chemical weathering. (
 - 2. The chemical weathering can change the color of rocks.)
 - Weathering of rocks is a slow natural process that often takes many years to see its effect.
 - In this activity we will model and explore both mechanical and chemical weathering to understand the similarities and differences between them.

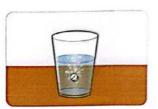
Tools



Biscuits (crackers)



Piece of cloth



Antacid tablet in a cup of water

Steps

1. Crush some biscuits inside the piece of cloth with your hands for few seconds.



Put some other biscuits in a cup of water contains antacid (Antacid is a medicine used to treat the high acidity of stomach).



Observations

- 1. In the first step, biscuits are broken down into smaller parts, but they still looked like biscuits.
- 2. In the second step, biscuits dissolve and mix with water containing antacid causing a formation of different material.

modeling tools crackers

natural تصميم نموذج

cloth أدوات

crush طبيعي acidity قماش

explore قرص مضاد للحموضة antacid tablet مقرمشات

حموضة

medicine کشر treat

observation

دواء يعالح

Conclusions

- 1. In the mechanical weathering, the substance is broken into smaller parts without
- 2. In the chemical weathering, the substance is broken into smaller parts and another substance is formed as a result of chemical reactions.
- 3. Chemical weathering causes greater changes to substances than that happen in mechanical weathering.

V Note

Scientists use models to recreate the weathering process to understand it better, because weathering takes along time in real life, and the rocks we can see now have been weathered over hundreds of years.



Check your understanding

- ▶ Choose the correct answer :
 - 1. The chemical weathering makeschanges than the mechanical (weak - great - little) weathering.
 - 2. Occurrence of weathering takes in real life.

(some hours – few days – hundreds of years)



Optional Digital Activity

an optional digital activity. You can do this activity by scanning its QR code found in your school book.

Activity 10 Weathering

- We have learned in the previous lesson that, there are two types of weathering which are mechanical weathering and chemical weathering.
- . Now, we are going to deduce if this landform shown below is affected by mechanical weathering or chemical weathering.



- You will notice from the previous picture that rocks are broken into smaller pieces with different shapes of the same material.
- This process is similar to that happened to biscuits broken by hands in the previous activity, this leads us to conclude that the landform shown above has been mechanically weathered over time.

-	
-8	1
-8	
1-0	1

Check your understanding

▶ Put (√)	or (x)	:
-----------	--------	---

- In both mechanical weathering and chemical weathering, the substance is broken down into smaller parts.
- 2. A new substance is formed if mechanical weathering occurs. ()
- 3. In mechanical weathering the rocks are broken into smaller pieces with different shapes and new materials. ()

In the Assessment Book : Try to answer : Self-Assessment 17

deduce

lead with

landforms يؤدي

تضاريس

Exercises on Lesson 3

• Create · Analyze Cnoose the correct answer:
 1. The breaking of rocks into smaller particles without changing their properties is b. chemical weathering. called 2. Which of the following does not cause mechanical weathering? d. Water movement. 3. The breakdown of rocks either mechanically or chemically is called 4. Crushing a piece of biscuit by hands is similar to of rocks. a. mechanical weathering d. deposition c. erosion 1. Roots of plants can slowly grow over time through small cracks in rocks Put (\(\sigma \)) or (X): causing chemical weathering. 2. When water freezes, its volume increases. 3. Reaction between oxygen with the iron of some rocks causes its chemical 4. Grinding of biscuits by hands into fine powder has the same effect of weathering. mechanical weathering of rocks. 3 Write the scientific term of each of the following: 1. A process in which a large rock is broken into small pieces. 2. A process that takes place in rocks and can be explained by pressing strongly on cubes of sugar until it becomes a powder. 3. A process in which the colors of paints of houses are changed as a result of falling of acid rains. 4 Complete the following sentences: 1. Cracks caused by freezing of water and melting of ice represent weathering.

2. In the _____weathering, the chemical structure of rocks doesn't change.

3. Putting some biscuits in a cup of water that contains antacid represents

4. Formation of limestone caves is an example ofweathering.

..... weathering of rocks.





, put (/) or (x):

Earth surface is reshaped through some processes like weathering, erosion and deposition.

2. After breaking down of rocks into smaller particles, they never move from a place to another.

We have learned in the previous lessons that the large rocks are broken down into smaller particles during weathering process.

Once the rock has been broken, it is ready for erosion.

Erosion:

It is the process in which the small particles (sediments) of sand, soil and rocks are moved to other places by wind, water and gravity.

Notes

- 1. Sediments are small solid materials such as sand, soil and small particles of rocks.
- 2. Sediments are moved by wind and water and settles on the surface of land or the bottom of water bodies such as lakes and seas.

Action of wind erosion:

 A gentle wind may carry sand grains for a short distance (about 1 meter), while stronger wind and hurricanes carry them for a longer distance.

Action of water erosion:

- Rivers and floods carry sand, soil and rocks downstream.
- Sea waves pull sand away from beaches.
- Rain washes away the soil of farms that locate beside downhill.





sediments

gentle wind
soil

hurricanes رواسب floods ریاح خفیفهٔ downstream تربهٔ downhill أعاصير settle فيضانات water bodies اتجاه جريان النهر

منحدر يستقر مسطحات مائية

Action of gravity erosion:

The broken weathered rocks in a mountain can be pulled down at mountainsides by the effect of gravity.

Formation of sedimentary rocks:

- Sediments are mixed with mud and remains of plants and animals at the bottom of oceans, lakes and in deserts forming layers.
- Over long period of time, more and more layers press down forming sedimentary rocks.





Sedimentary rocks



Note

You can see the evidence left by erosion after hundreds, thousands or millions of years from its occurrence.

More Information

- Glaciers are rivers of ice or snow that move slowly over the Earth's surface.
- Glaciers can help in erosion as they pick up and carry large rocks and soil.



Check your understanding

▶ Put (√) or (x):

- 1. Floods is one of the factors that cause water erosion.
- Gravity does not affect the small rocks that have been broken down from mountains.

Activity 12 Deposition

- We have learned from the previous lessons how rocks can be broken into smaller pieces through weathering process, and this small pieces are carried away through erosion process.
 - After erosion, the deposition process is the next stage that shows where these pieces of rocks might end up.
 - . When the wind blows, it picks up sand into the air.
 - . As the wind moves, the sand may travel with it to a new place.
 - . When the wind stops blowing, the sand falls onto the ground and deposites.

Deposition:

It is the process of laying down of sediments after its erosion.

 Now, let's see some examples that show how deposition process affects the shape of land.

Action of water in deposition:

- Running water in rivers play an important role in deposition process such as :
- · A river can deposite a sandbar along its banks (sides).
- When a river carries sediments meet a sea, these sediments are deposited there forming a delta such as the Nile Delta.



The Nile Delta

Delta:

It is a fan-shaped (triangle-shaped) mass of mud and other sediments that forms where a river enters a large body of water.

 Sea waves also move sand from one place to another new place where it deposites there.

laying down stage sandbar

delta اسقاط blowing مرحلة

river banks شريط من الرمال

دلتا triangle mud هبوب banks ضفاف النهر مثلث

طین

Action of wind deposition:

- Weak and strong winds play an important role in deposition process such as ;

- Weak and strong winds play art impos	Strong winds
Weak winds	- They can form large sand dunes.
- They can form small sand dunes.	
Example: • Sand dunes on a beach.	Examples: Sand dunes In: Western Desert in Egypt. Rub' Al Khali in the Arabian Peninsula



Check your understanding

► Choose from column (B) what suits it in column (A):

(A) Deposition factors	(B) Its effect
1. Wind in the desert.	a. Formation of a delta.
2. A river meets the sea.	b. Formation of sand dunes.

In the Assessment Book: Try to answer: Self-Assessment (18)

Exercises on Lesson 4

O Apply Analyze Understand Evaluate 1 Choose the correct answer: Create 1. Moving of sediments from a place to another represents process. a. weathering b. photosynthesis c. erosion d. deposition 2. A gentle wind may carry sand for a distance, but the hurricanes can carry sand for a distance. a. long - shorter b. long - longer c. short - shorter d. short - longer 3. A _____is formed where rivers meet a sea. b. mountain c. volcano d. canynon 4. Which of the following arrangements is correct about reshaping Earth's surface? a. Erosion → Weathering → Deposition. b. Erosion —→ Deposition —→ Weathering. c. Deposition → Erosion → Weathering. d. Weathering —→ Erosion —→ Deposition. 5. Each of the following plays a role in erosion process, except a. blowing wind. b. water floods. c. sunlight d. Earth's gravity. 6. Gentle wind can carry for a short distance. a. sedimentary rocks b. sand grains c. a large body of water d. a big mass of mud 7. Pulling sand away from beaches by sea waves, is considered as an example of a. mechanical weathering. b. chemical weathering c. erosion. d. deposition. 8. Pulling down broken weathered rocks at mountainsides occurs by the effect of a. gentle wind. b. freezing of water. c. Earth's gravity. d. chemical weathering. 9. Sedimentary rocks is formed of a. one layer of sediments. b. many layer of sediments. c. water mixed with sand. d. water mixed with soil. 10. When a river that carries sediments meet a sea, is formed. a. a layer of sedimentary rock
 b. a triangle-shaped delta c. a small sand dune d. a large sand dune

Understand

Analyze

	 Put (//) or (X): 1. The effect of erosion may last for hundreds of years. 2. Sea waves may cause erosion of beaches. 3. Gravity pulls rocks down the mountainsides causing its erosion. 4. Deposition process never change the shape of the land. 5. Sediments are usually liquid materials that settle on the surface of lare. 6. Strong wind and hurricanes carry sand grains for a short distance. 7. Blowing of wind and flooding of water play an important role in erosion process. 8. Sedimentary rocks are formed in a short period of time. 9. Nile delta is a triangle-shaped mass of mud and other sediments. 	(((n ((
•	Nile delta is a triangle-shaped with the shaped of th	(
	 Write the scientific term of each of the following: It is the process by which natural forces move weathered rocks and so one place to another. It is the process in which weathered rocks and soil are laying down on by wind, water or gravity. A fan-shaped (triangular) mass of sediment that is formed where a rive a larger body of water like seas. A hill of sand created by the wind. They are small solid materials such as sand, soil and small rocks that by water to another place. The force that pulls down broken weathered rocks at mountainsides. 	r dropped (rer enters ((t carried
	 Complete the following sentences: Wind, and gravity are natural factors that control erosion progration. Sand grains on the ground when the wind carrying it stops. Sediments are mixed with the remains of and form at the bottom of oceans and lakes. Blowing of strong in the desert may form large sand dunes. Strong wind and hurricanes carry for a long distance. When you see a mountain which is formed of many layers pressing e others, this means that it is formed of rocks. Gentle winds can form small like that present at sea beaches. 	ning lay ^{ers} ach

What happens when ...?

What happens when ...?

More and more layers of sediments settle on the bottom of oceans, lakes and in deserts.

2. A river carries sediments meet a sea.

Study the following two figures of mountains, then complete the sentences below:



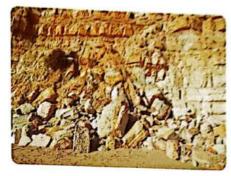


Figure (1)

Figure (2)

- 1. The effect of weathering process appears more clear in figure number
- 2. Sedimentary rocks appear more clear in figure number
- 3. Broken weathered rocks that pulled down by the effect of gravity appear more clear in figure number

LESSON





- ▶ Put (√) or (x):
 - 1. The erosion process happen very slow.
 - 2. The deposition process happen without erosion.
- From the previous lessons, we have learned that :
 - The surface of the Earth is continuously changing from time to time.
 - There are three processes that have an important role in changing the Earth's surface, which are weathering, erosion and deposition.
- Now, we will study how these processes happen in order.

Weathering: It is caused when wind or water wears down rocks or the shape of landform is changed by mechanical or chemical processes.



Erosion: It is caused when wind or water moves materials from one place to another.



Deposition: It occurs when eroded materials stop moving and settle on a surface, often forming layers over time.



- By the action of the three previous processes we can observe changes in the Earth's surface such as :
 - · Sand dunes which are small hills of sand found in a desert or on top of a beach.



Delta Which is a piece of land shaped like a triangle that is formed when a river enters a large body of water such as a sea or an ocean.



The Nile Delta

Note

Erosion and deposition are linked processes, erosion does not occur in one place without deposition in another, and vice versa.



Check your understanding

- Complete the following sentences using the words below:

 (erosion weathering deposition)
 - The process in which rocks are broken down to form sediments is called
 - 2. The process in which the eroded rocks stop moving and settle on a surface is called
 - 3. The process in which sediments are transported by water or wind from a place to another is called

ocean transport

ا محیط linked ننتقل vice versa

مرتبط

والعكس صحيح [165]

Activity 16

Review: Breaking Down and Moving Rocks

We can summarize this concept in the following main points :

- Sand is formed by breaking down of some types of rocks.
- Forces of water and wind are responsible for the disappearance of sandcastles and erosion of coasts.

canyons:

They are deep valleys covered by flowing water.

- · Earth's surface changes through different processes such as weathering, erosion and deposition.
- Weather is different from weathering.

Weather:

It is the condition of atmosphere at a specific time and place.

Weathering:

It is the breaking down of rocks on Earth's surface into smaller (tiny) pieces.

 There are two types of weathering which are mechanical weathering and chemical weathering.

Mechanical weathering:

It is the breaking down of rocks due to the effect of physical factors like wind, water, plant roots and temperature.

Chemical weathering:

It is the change of the structure of rocks due to chemical reactions.

- In the mechanical weathering we can see the breaking down of a substance without changing of its nature.
- In the chemical weathering we can see the breaking down of a substance and formation of another substance as a result of chemical reactions.

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Erosion:

It is the process in which the small particles (sediments) of sand, soil and rocks are moved to other places by wind, water and gravity.

- The formation of sedimentary rocks:
- Sediments are mixed with mud and remains of plants and animals forming layers at the bottom of oceans, lakes and in deserts.
- Over long period of time, more and more layers press down forming sedimentary rocks.
- You can see the evidence left by erosion after hundreds, thousands or millions of years from its occurrence.

Deposition:

It is the process of laying down of sediment after its erosion.

Some effects of deposition process in the shape of land :

Factor causes changes	Its effect	
1. A river meets the sea.	- Formation of a delta.	
2. Wind in the desert.	- Formation of sand dunes	

In the Assessment Book:

Try to answer:

- Self-Assessment (19)
- · Model Exam on Concept (4.1)

Exercises on Lesson 5

Understand	Oxphia	Analyze			
tho c	orrect answer		Evaluate	• Create	
Choose the C	orrect answer :			Juliani	,
1 As a look	of breaking down of	, sand is t	lorme d		
a. Jubbo.		b. plastic	ormed,		
c. rocks		d alaes			
2. Conditions	of atmosphere includ	ing temperature w	de d		
		, state, w	and rains is kr	iown	
a. weather		b. weathering			
c. deposition	on	d. erosion			
3. The breakd	down of rocks either mathesis.	nechanically or che	miceller		
a. photosyr	nthesis.	b. weathering.	mically is known a	IS	
c. erosion.		d. deposition.			
4. When a riv	er meets a sea or an	ocean, a	in former		
a. canyon		b. volcano	is formed.		
c. mountair	า	d. delta			
	Λ.				
2 Put (//) or (X					
1	e of the Earth never c			()
	caves are formed as		l weathering.	()
3. When wate	er freezes, its volume	decreases.		()
Write the sci	entific term of each o	of the following:			
	eep valleys carved by			()
	which small broken ro		place by the help of	of wind o	r
water.			,	(
3. Process in	which the moving sec	diments are droppe	ed in a new place.	()
	e following sentences		31		-
1. The origin	of sand is the breaking	a down of some tvi	nes of		
2. The type of	f weathering in which	the rocks are broke	en down due to th	e preser	nce
of plant roo	ots is known as	weathering.	on down and		
3. Cracks cau	sed by heating and c	ooling of water rep	resent a type of w	eatherin	g
MIOWN as	weathering.				
4. When stron	ngblow in th	e desert, large sar	nd dunes are form	ed.	
•	James Diow in the				

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Model Exam on Concept (4.1)

Total ma

20

a. few minutes. b. few hours. 2. Which of the following does not cause mechanical weathering b. Acid rains a. Roots of plants d. Water movement. 3. Moving of sediments from a place to another represents	
2 (A) Put (✓) or (X):	(5 marks
 Sea waves may cause erosion of beaches. 	(
2. The surface of Earth changes from time to time.	(
 All physical factors of mechanical weathering lead to breaking rocks. 	down of
	(
When water freezes, its volume decreases.	(
(B) What happens if?	
Lichens growing on rocks produce acids.	(
(A) Write the scientific term of each of the following :	(5 marks
 Process in which small broken rocks move from a place to an help of wind or water. 	other by the
2. A process in which the colors of paints of houses are changed	(
a result of falling of acid rains.	as
3. A Fan-Shaped (triangular) mass of and	(
 A Fan-Shaped (triangular) mass of sediment that is formed what a river enters a larger body of water like seas. 	iere
They are deep valleys covered by flowing water.	(
nowing water.	(

(B) Stay the following figures, then choose the correct answer below:

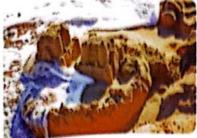


Figure (1)



Figure (2)

1. The force of water forms	
	b. figure (2) only.
/1) and (4):	d. neither figure (1) nor (2).
that affects the item in it	gure (1) is considered as an example of
a. human - made changes.	b. artifical changes.
a. numer.	d. slow changes.

(A) Complete the following sentences :

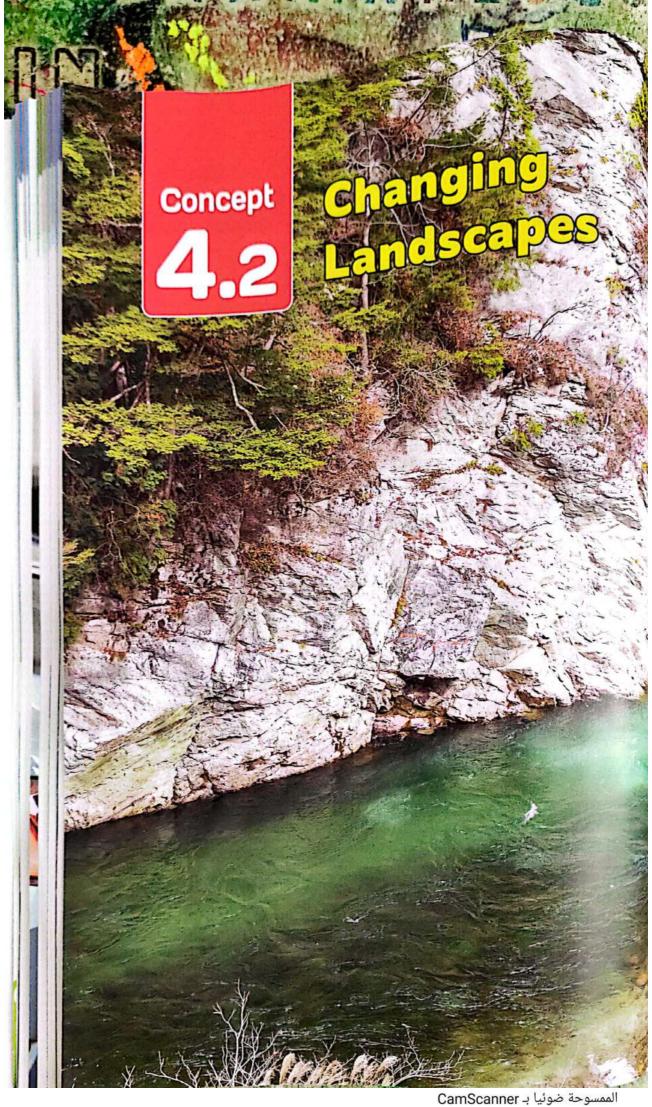
(5 marks)

(A) Complete the 10	MANUAL COLUMN TO THE COLUMN TO
uing a statue	is an example of mechanical weathering, while rusting of an
1. Breaking a state	weathering
iron statue is an ex	cample of weathering.
011.5	on the ground when the wind carrying it stops.
2. Sand grains	on the grant dumen are formed
-4-000	blow in the desort, large sand duries are formed.
3, WHEN 30019	freezing of water and melting of ice represent
A Cracks caused by	freezing of water and moung or iss representation
weathering.	

(B) Choose from column (B) what suits it from column (A):

(A)	(B)
1. Costal rocks.	a. are formed due to boiling of water.b. can be made in few hours from sand
2. Canyons.	particles on seashores. c. deep valleys that are carved by flowing of
3. Sandcastle.	water. d. are formed near seas over many years and have needle-like parts and sloping sides.

J. _______ 3. ____







Activity 1 Can You Explain?





You have learned in the previous concept that many factors can change and break down Earth's surface such as weathering, erosion and deposition and they form many landforms as canyons.

As you have learned, canyons as shown in pictures above are deep valleys carved by flowing water.

How are canyons formed?

- · A canyon can be formed in many ways, such as weathering and erosion due to wind, water and other factors.
- · Canyons can take millions of years to be formed.

In this concept, we will study:

- How landscapes change.
- · Canyon formation.
- · Canyons and valleys.
- · Delta formation.
- · Wind erosion.
- · Rock layers of Wadi Al-Hitan.

valley أخدود landscape تضاريس

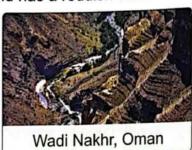
مظاهر السطح

Activity 2 Canyons

- Look at the opposite picture, then put (√) or (×):
 - The flow of water on the sand can change its shape.
 - 2. The sand particles remain in there positions when the water flows over them.



- ▶ When the water is moving over the sand, it pushes some of the water to
- As the water moves the sand, it leaves an impression where the water flowed.
- This is the same idea of canyons formation.
- Canyons are formed due to erosion by water for a long period of time, as water can wear away landscapes and move sediments.
- Canyons differ in their colors, texture and shape of rocks, where:
 - Wadi Nakhr canyon in Oman its color is brown and black but the Small Canyon in Thailand has a reddish color.



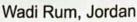


Small Canyon, Thailand

- Canyons can have V-shape as in colored canyons in Sinai and Wadi Rum canyon in Jordan.









Check your understanding

- ▶ Put (√) or (x):
 - 1. Canyons are formed due to long term erosion.
 - 2. All canyons have the same shape.
- 3. Wadi Nakhr canyon in Oman has V-shape.

impression push

Jordan اثر texture بدفع

Thailand الأردن reddish color

What Do You Already Know About Changing Landscapes?

Understanding the formation of Underms help predict future changes :

Example:

Canyon formation:

- The opposite picture shows a small canyon at the beginning of its formation by the effect of a stream of water, which can be observed from the following evidence :
 - . Trees and other plants that are growing on both sides of canyon, need water to grow.
 - . The sides are gently sloped due to the help of water in wearing (eroding) the sides down.



Small canyon

From the previous example we can predict that :

- · Water streams that flow over flat land will probably form small canyons.
- The small canyon shown above could get deeper if it rained a lot, and water ran through it again.

Beside canyons, there are many other forms of landforms such as :



Mountain



Dunes



Valley



Check your understanding

▶ Complete the following sentences:

- 1. The canyon is formed by the effect of
- 2. The sides of are gently sloped.

gently sloped wearing sides down

probably منحدر قليل الميل deeper تآكل الجوانب

evidence على الأرجح

Activity 🔼

Landscapes in Your Environment

- Imagine that you go to your school after a rainy day, you can see some change in the school landscape due to some processes happend, for example :
 - You can see rounded and worn small rocks and that is an evidence of weathering process.



 You can see an area with small canyons where soil was washed away after heavy rain and that is an evidence of erosion process.



 You can see a patch of sand in the playground after heavy rain and that is an evidence of deposition process.



▶ You can see the same processes happen in large landscapes in nature, where

School landscape

Large landscape in nature

Weathering process:

Instead of weathering of small rocks at your school playground,





you can see big rocks of a mountain were broken off.



rounded worn instead of washed away مستديرة patch of sand

mountain رقعة من الرمل

playground

school landscape

Erosion process:

Instead of small canyons in the land of your school,



Large landscape in nature

you can see the walls of a canyon were eroding by the effect of a river movement.



, Deposition process :

Instead of a patch of sand at your school playground,



you can see a river makes new land from sediments by deposition.



Note

It might be useful to recognize signs of weathering, erosion and deposition because it may help in building houses in safe places, where :

- People must not build a house on a hill that is eroding.
- People must not build a house very close to a river, as if the path of a river is changed, it causes erosion and deposition of the house.



Check your understanding

▶ Put (√) or (*):

- 1. We can't see any changes in our environment after raining.
- 2. In nature only weathering takes place but in small landscapes deposition and erosion happen.

 () In the Assessment

In the Assessment Book:
Try to answer:
Self-Assessment 20

sediments

recognize الرواسب

179 يلاحظ

c. weathering and erosion processes.

d. weathering and deposition processes.

(x) or (x):		
Put (V) or (X): The shape of rock will be rounded and worn due to the effect of deposit	ion	
(100	1011	
process.	, (
process. A canyon may be formed due to the effect of wind weathering and erosion and Rum in Jordan is an example of dune. Wadi Rum in Jordan is an example of dune.	n. (
When the water is moving over the sand, it leaves an impression on it.	(
When the water to the effect of water stream on a flat land	(
When the water on the effect of water stream on a flat land.	(
A canyon may take	(
the scientific term of each of the following:		
the landform that is formed by the effect of weathering and erosion		
due to wind, water or other factors.		
2. The two processes that have the main role in formation of canyon.	******	
Complete the following sentences by using the words below:		
(deposition – impression – water – canyon – gently)		
1. When the rain falls on a flat sandy land, it will leave an on the	land.	
2. Wadi Nakhr in Oman is an example of landform.		
3. Canyon is formed by the effect of the stream of		
4. The deposition of a patch of sand after a heavy rain is an example of the		
process. 5. The sides of the canyon at the beginning of its formation are	loped	l.
Give reasons for :		
 Trees and other plants are growing on both sides of small canyons. 		
		••••
2. It might be useful to recognize signs of weathering, erosion and deposi	tion.	

Analyze

- 6 What happens to ...?
 - A flat land, if a water stream flows over it.
 - 2. A house that is built close to a river, if the path of the river is changed toward this house.

Complete the sentences below each picture using the following words: (Weathering - Erosion - Deposition)



Small rocks of a mountain

1. process.



Formation of new lands at river's end

2. process.



Carving of a mountain by a river stream

3. process.

put (V) or (X): Canyons are changes in landsca	pes that take long time to be formed s.
1. Jelides al o	

have learned that some changes of landscapes take short time and some others take long time.

Example of fast changes :

The opposite picture shows mudslide that represents a very quickly change in the landscape due to flooding rain.



Example of slow changes:

The opposite picture shows a change in a landscape that contains a river and mountains.

· How was this landform created ? This landform might have been created when the river has worn away the rock between the mountains, then wind and weather erosion could be breaking down the sides of the mountains.



· How will this landform change over the next 100 years?

There are two changes may happen to this landform which are :

- The river may get wider and the curves get bigger.
- The river may dry up leaving a small canyon between mountains.

1
١
١

Check your understanding

Put	(1)	or	(x)	:
-----	-----	----	-----	---

- 1. The changes that take place to landforms may take long time or short time.
- 2. Mudslides are landscape changes that take long time.

()
,	1

1	^{Valkabout}
1	ainwater
1	nudslide
	ende

	جولة
أمطار	مياه ال
Albi	

flooding rains created wider

leaving أمطار غزيرة curves انشأت

ללו deep

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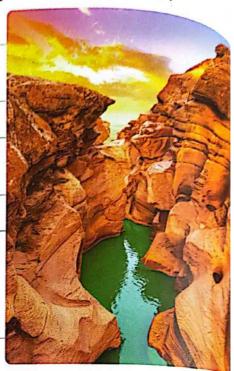
Activity 6 Canyon Formation

- Canyons are special types of valleys that have steep sides.
 - Many valleys including canyons are formed by the same way, where ;

Gravity pulls rainwater downhill forming small streams.

These small streams join together forming a bigger stream (river).

The water of the river flows fast across the land and erodes a pathway through the landscape that makes the river carve out a valley.



- 1. The shape of a valley depends on several factor including :
 - The types of rocks exist in the landscape.
 - The speed, age and size of river that form the valley.
- 2. Big streams or rivers cause more erosion than small streams.
- 3. Rivers that flow fast cause more erosion than rivers with slow flow.
- Now, let's study one of the most famous canyons on Earth which is called the "Grand Canyon":

Grand Canyon:

- · It is located in United States of America.
- · It is very large and steep canyon, and it contains many layers of rocks.
- · This canyon contains a river in its bottom.



The Grand Canyon

downhill pull streams

steep لأسفل bottom يسحب river مجاري الأنهار

carve out شدید الانحدار pathways أسفل / قاع

ation of the	Grand Ca	nyon
--------------	----------	------

, Formati portion of time (millions of years), the water of the river there flowed so over long period of time (millions of years), the water of the river there flowed so over long period of time (millions of years), the water of the river there flowed so Over long poor to travelling of the river down a steep slope.

The water of the river eroded the rock and cut them deeply.

The fast flow of water eroded a lot of sediment and carry them away that leads to the formation of the Grand Canyon.

Check your understanding

> put (√) or (×):	
1. As the stream is bigger, it cause more erosion.	()
2. Rivers erode rocks and can form valleys and canyons.	()
3. Canyon walls are not very tall and have gentle slopes.	()
4. A canyon is a type of valley.	()
5. Rivers can change a landscape very slowly.	()
6. Fast moving rivers can cause a lot of erosion.	()
	1 desired

In the Assessment Book: Try to answer: Self-Assessment (21)

^{cut them} deeply

flowed يقطعهم بعمق

lead to تدفق

يؤدى إلى

2. It is a very large and steep canyon which is found in United States of America.

the following sentences by using the words below:
(speed – wind – sediment – valleys – gravity)
1. The sides of a mountain could be broken down by the effect of
Give a reason for the following:
Mudslides represent a fast change in the landscape.
6 What happens if?
A river erodes the sediments of a mountain over a long period of time.

LESSON



Activity Canyons and Valleys

- ▶ Put (√) or (x):
 - 1. When water flows quickly, it causes more erosion.
 - 2. Canyons don't have steep sides.
- We have known that the canyons are a special type of valleys. Now, let's study the similarities and differences between canyons and valleys

Canyons

- They are the areas that were eroded in mountains.
- Their walls are usually very high (have great depth), steep, narrow and consist of many layers of rocks.

Similarities

- Both of them can be formed by rivers or streams.
- Both of them often have rivers or streams flow through the lowest points.
- They are lowland areas in between mountains
- They have gently sloped sides that usually surround a wide flat plain.



A canyon



A valley

 Geologists study the layers of rocks in the canyon walls to learn about kinds of living things existed there long ago.



Check your understanding

- ► Complete the following sentences:
 - 1. Valleys and canyons often have flow through the lowest points.
 - 2. Geologists study the layers of rocks in the canyons to learn about existed there long ago.

sloped lowland flat plain

wide منحدر similarities ارض منخفضة

depth elms

Activity 8 Delta Formation

the previous activities, you have learned that valleys and canyons are formed by weathering and erosion processes.

formed by deposition processes, in this activity, we will learn about deltas which are formed by deposition processes, where:

Streams or rivers which flow fast carry sediments which called silt.

As the river water flows along its journey, it carries more and more sediments until the river water becomes full of sediments.

When the speed of the river water decreases, it drops the sediments (silt) which it is carrying forming deltas.



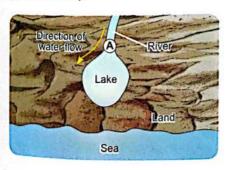
Small deltas

Note

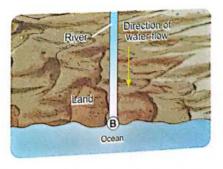
Silt is made of very fine bits of sand, clay or rock materials.

Most deltas are formed when fast flowing water enters slower moving water or still water such as:

Adelta can be formed at area (A) as the river (fast flowing water) enters the lake (still water).



A delta can be formed at area (B) as the river (fast flowing water) enters the ocean (slower flowing water).



Notes

Large wetlands are formed in deltas.
 Plants that grow in the wetlands found in deltas increase deposition process because.
 Plants are particular down the river water.

- Plants are partly responsible for slowing down the river water.
- Roots of plants have

Roots of plants help in trapping sediments.

The Nile River Delta:

- From the most famous deltas in the world is the Nile River Delta.
- The Nile River Delta has a triangular shape and it lies between Cairo and the northern coast of Egypt.
- It was formed in Egypt as a result of the rapid flow of the Nile River, which travels a distance of about 6,600 kilometers to pour into the mediterranean sea.
- It covers over 20,000 square km in Egypt, and it is characterized by the presence of fertile soil that allows the cultivation (planting) of different types of crops.



The Nile River Delta

Check your understanding

- ▶ Put (√) or (x):
 - 1. Deltas are formed by erosion processes.
 - 2. Deltas are formed when the speed of river water increases.

In the Assessment Book: Try to answer: Self-Assessment (22)

Exercises on Lesson 3

OApply	Analyze		
derstand	• Evaluate	• Create	
the Collect distres.			
choose main difference between	n valleys and canyons is that valleys b. steep slope walls	have	
	b. steep slope walls.	nave	·lia
antiv sloped sides.	d. vertical walls.		
of canyons are charact	erized by all the following, except that	thou	
a. are very high.	b. are gently sloped.	uley	
c. have great depth.	d. consist of many rock layers	2	
then the speed of the water	er stream that is run over a mountain	incresses	
the rate of erosion will		moreases,	
a. increase.	b. be constant.		
c. decrease.	d. become slower.		
Deltas are formed when the	speed of river water		
a. increases.	b. decreases.		
c. doesn't change.	d. become faster.		
	ne river stream entering all of the follo	wing,	
except			
a. a lake.	b. a sea.		
c. a mountain.	d. an ocean.		
6. Nile River Delta is characte	rized by the presence of tha	at allows the	
planting of different types of	f crops.		
a. mountains	b. sand dunes		
c. polluted soil	d. fertile soil		
Put (V) or (X):			
1. Both canyons and valleys of	often have river in their bottom.	()
2. The walls of valleys are ver	tical and steep.	()
3. Deltas are formed as a resu	ult of silt deposition.	()
	an, 9. on, 4-p		

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Create

Evaluate

Ariver





A valley Picture (B)

A canyon Picture (C)

is passed through a flat land for a short period of time, the landform in picture may be formed. erosion for a long period of time. 3. The landform in picture have gently sloped sides. in picture in their lowest points.

- Put (√) or (x):
- The movement of wind can form different landforms over years.
- 2. Erosion and deposition processes can create some landforms. In the previous lessons, you have learned that water can change the shapes

In this lesson, we will learn that wind also can be a powerful force of change, where wind in desert can change the shape of rocks by erosion.

Wind erosion:

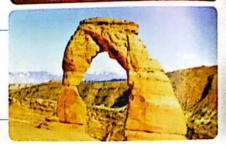
When wind blows across the land, it picks up sand and other rock particles and carries them along.



When this flying sediment hits a rock, it wears down that rock.



This process carves the rock into different shapes.



▶ Some landforms are created by erosion and deposition processes at the same time as sand dunes.

Sand dunes:

- Sand dunes are landforms which are made of windblown sand when something like rock blocks the wind.



Sand dunes in beach

blow picks up sand dunes

block تهب flying sediment يلتقط wears down

الرواسب المتطايرة

sand dunes يمنع / يحتجز windblown

الكنبان الرملية هوب الرياح

- Sand dunes are common landforms between beach and sandy desert environments.
- Sand dunes usually seen in groups, and they may cover a large area.
- Sand dunes can be hundreds of meters tall.



Sand dunes in sandy desert

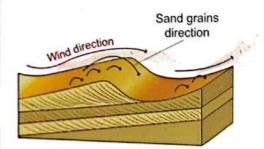
Sand dunes movement:

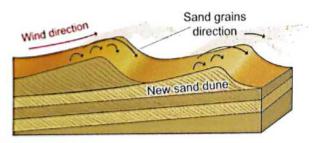
Sand dunes are continuously moving as follow:

When wind blows across a dune, sand grains erode away from the side that wind is coming from.

The sand grains carried by the wind are collected along the slope of the dune.

When the sand reach the top, the dune forms a barrier to the wind, and then the sand grains roll down the other side.





- ▶ Generally, we can conclude that water and wind can change landscapes (such as canyons, mountains, dunes ... etc.) over time, where :
 - Running water can wear away the sides of a river or stream.
 - Wind can break down rocks.



Check your understanding

- Complete the following sentences:
 - 1. Sand dunes are formed by _____ process and deposition process.
- 2. The common landforms between beach and sandy desert environments are

barrier continuously sand grains حاجز sandy desert حبوب الرمل صحراء رملية

Activity 10

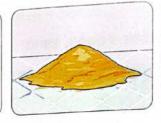
Sand Shifters

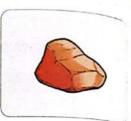
- You have learned that sand dunes are formed when wind moves the sand and drops it in a place when something blocks the wind, then wind drops lots of sand in the same place.
- In this activity we are going to show by a simple experiment how sand dunes are formed and moving.

Tools:









Aluminum foil pan

Straw

Sand

Small rock

Steps:

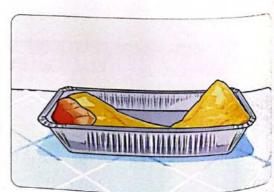
- 1. Place a small rock in the pan at one of its sides.
- 2. Put suitable amount of sand at the other side of the pan.
- 3. Use the straw to blow air infront of the sand with a certain direction and small force, as shown in the figure.



4. Repeat the previous step with changing the direction and increasing the force of blowing.

Observations:

- 1. When blowing the air with a small force. sand travels a short distance, and by increasing the force of air blowing, sand travels a longer distance.
- 2. When the air blows at the same direction of the small rock, sand is blocked and collected infront of the rock.



aluminum foil pan 196 collected

straw طبق من الألومنيوم blow ureas

Conclusions:

- 1. The wind moves the sand, where:
 - The distance that the sand travels depends on the force of the wind.
 - The way that the sand moves depends on the direction of the wind.
- The dunes are often formed when something blocks the path of sand, such as rocks.



Check your understanding

- ▶ Choose the correct answer:
 - When the force of wind increases, the distance the sand travels
 a. increases.
 b. doesn't change.
 c. decreases.
 d. stays constant.
 - 2. The are formed when something block the path of wind carrying sand.
 - a. mountains b. valleys c. sand dunes d. rivers

In the Assessment Book: Try to answer: Self-Assessment 23

Complete the following sentences by using the words below:	
(direction – wind – rocks – decreases – hundreds)	
, Wind erosion can carve the into different forms.	
2. Sand dunes are in continuous motion due to the movement of	
3. When the force of wind, the sand can't travel for a long distance.	
, Sand dunes may reach of meters tall.	
5. Sand can move forward or backward depending on the of wind.	
Give a reason for the following :	
A sand dune may be formed in front a large rock in desert .	
What happens if?	
Wind that is carrying sand particles hits a big rock.	
Arrange the following sentences to show the steps of how wind can erode a rock :	
() Flying sediment hits the rock.	
() Blowing of wind across a land.	
() The sediment carves the rock into different shapes.	
() Wind start to pick up sand and other rock particles and carries them away	/.



Activity 11 Rock Layers of Wadi Al-Hitan

- ▶ Put (√) or (x):
 - 1. In erosion process, material is carried away and it is left somewhere else.
 - The shapes of large rocks in a desert change over time.
- In the previous lessons, you have learned that landscapes change over time, Geologists: where:
 - When rocks are weathered, tiny pieces that break down and float away are called "sediments".
 - Geologists call each separated rock layer a "formation".
 - The layers of sediments may hold fossils of plants and animals that existed there in the past.
 - Geologists study the layers of sediments in rock formations to know how the landscapes looked like in the past.
- ▶ In this lesson, we will study an example of a landscape that has changed over time.

Formation of rock layers of Wadi Al-Hitan:

As any landscape, Wadi Al-Hitan which is found in Fayoum governorate in the western desert of Egypt, it has changed over time as follows:

When rocks were weathered, tiny pieces broke off forming sediments that floated away.

Sediments built up in layers at the bottom of a sea that covered all of northern Egypt 40 millions years ago.



are scientists who

study rocks.

Wadi Al-Hitan

As the sea moved out, it left thick layers of sediments.

Later, these layers of sediments formed sedimentary rocks such as limestone and sandstone.

geologists formation fossils

limestone تکوین صخری

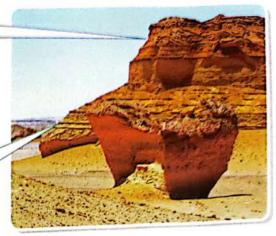
sedimentary rocks علماء الچپولوچيا sandstone حفریات

Arrangement of rock layers in Wadi Al-Hitan:

The top layers of the higher cliffs contain the newest rocks.

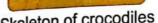
The same

The bottom layers contain the oldest rocks that made up of sedimentary rocks contain fossils which tell us that a deep sea once existed there.



Some fossils of Wadi Al-Hitan :







Skeleton of crocodiles Large skeletons of whales



Skeletons of sea cows



Skeleton of turtles



Shark teeth

Check your understanding

- Complete the following sentences:
 - 1. Geologists call each separated rock layer a
 - 2. Wadi Al-Hitan contains fossils in its oldest formation such as _____ and ____
 - 3. The scientists who study rocks are called

Activity 12 Describing Landforms

- In the previous lessons, you have learned about landforms and how they are formed.
 - Canyons and valleys are formed due to erosion by water and wind.
 - Deltas are fan-shaped (triangular shape) landforms where river enter lakes, seas or oceans and they are formed due to deposition process.
 - Sand dunes are formed due to erosion and deposition processes caused by wind

V Note

During a storm or a rockslide, erosion can happen quickly but in general, erosion happens slowly.

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Check your understanding

Complete the following sentences using the words below :

(deltas - canyons - sand dunes - slowly - rivers - wind - quickly)

- 1. are deep valleys with steep sides.
- 2. are fan-shaped landforms where rivers enter lakes or oceans.
- 3. ____ are hills that are made of sand.
- 4. are often what causes the formation of both valleys and canyons.
- 5. and sand work together as forces of erosion in the desert.
- 6. During a storm or a rockslide, erosion can happen
- 7. In general, erosion happens
- ▶ In the following table, write how each landform is caused by using the words below: (you can use the word more than once).

(Water - Wind)

	Canyons and valleys	Deltas	Sand dunes
Causes:			

Activity 🔢 **Record Evidence Like A Scientists**

- ▶ In this concept, you have learned a lot about the formation of canyons, valleys, deltas and sand dunes.
- · Now, try to think like a scientist by writing your claim, your evidence and your scientific explanation about one of the main points of this concept through the four steps you have learned in the previous concepts.

	e Question
How are canyo	ons formed ?
Step 2 My	/ Claim
Step 3 My	/ Evidence
	C-ititle Fundametica
Step 4 My	/ Scientific Explanation
Step 4 My	/ Scientific Explanation
Step 4 My	
Optional D	igital Activity
Optional D Activity 14 "Ph	

claim

evidence افتراض

scientific explanation دليل

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Activity 15 Review : Changing Landscapes

- We can summarize this concept in the following main points:
- A canyon can be formed in many ways, such as weathering and erosion due to wind, water and other factors.
- Canyons can take millions of years to form.
- Canyons are special types of valleys that their sides are steep.
- The shape of the valley depends upon several factors as :
- The types of rocks present in this landscape.
- The speed, age and size of the river in this landscape.
- Grand Canyon is an example of canyon that is found in the United States of America, and it is very large and steep, contains many layers of rocks.
- Big streams or rivers cause more erosion than small streams.
- Rivers that flow fast cause more erosion than rivers with slow flow.

Canyons-

- They are the areas that were eroded in mountains.
- Their walls are usually very high (have great depth), steep, narrow and consist of many layers of rocks.

Similarities-

- Both of them can be formed by rivers or streams.
- Both of them often have rivers or streams flow through the lowest points.

-Valleys-

- They are lowland areas in between mountains.
- They have gently sloped sides that usually surround a wide, flat plain.

- Deltas are formed by the process of deposition.
- Most deltas are formed in two cases, where flowing water enters still water (immovable water) or slower moving water. And this two cases could be:
- A river stream enters a lake. A large river stream enters sea or ocean.
- · From the most famous deltas in the world is the Nile River Delta.

- Some landforms are created due to erosion and deposition processes by wind and sand at the same time as sand dunes.
- The sand dunes usually seen in groups, and they may cover a large area.
- · The sand dunes can be hundreds of meters tall.
- Sand dunes are common landforms between beach and sandy desert.
- . The wind moves the sand where :
- The distance that the sand travels depends on the force of the wind.
- The way the sand moves depends on the direction of the wind.
- The sand dunes often formed when something blocked the path of the sand, such as rocks.
- Scientists look at the rock layers to determine what the area looked like long ago.
- · Geologists are the scientists who study rocks.
- · Geologists call each separated layer of rock a "formation".
- When rocks are weathered, tiny pieces that break down and float away are called sediments.
- At Wadi Al-Hitan, the oldest rocks are found at the bottom of layers while the newest rocks are found at the top of layers.
- The oldest formations of Wadi Al-Hitan are made up of sedimentary rocks, containing fossils which tell us that a deep sea once existed there, such as large skeletons of whales, skeletons of sea cows, shark teeth, skeletons of turtles and skeletons of crocodiles.

In the Assessment Book:

Try to answer:

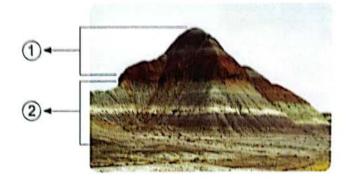
Self-Assessment (24)

Model Exam on Theme (4)

Exercises on Lesson 5

-	Inc	lerstand	The same of the sa	• Analyze	• Evaluate
Ī	One	erstand	Apply		• Creale
1	C	hoose the correc	t answer:		
•	1.	40 million years	ago. Wadi Al-Hita	n was covered by	mandania.
		a. rocks.	ago,	b. sand.	
		c. sea,		d. mud.	
	2.	Among the exam	onles of sediment	ary rocks which p	resent in Wadi Al-Hitan
ł		is/are	ipios of bouiline		***
ł		a. sandstone on	lv.	b. limestone onl	y.
		c. both sandston	e and limestone.	d. neither sands	tone nor limestone.
0	3.	The large skelet	ons of whales tha	at are present in W	adi Al-Hitan considered
ı		as an example of			
1		a. fossils.	b. rocks.	c. sediments.	d. formations.
•	4.	Geologists are s	cientists who stud	dy	
		a. plants.	b. animals.	t to all the	d. rocks.
	5.	All the following	skeletons can be	found in Wadi Al-I	Hitan, except the
		skeleton of			47.
		a. whales.	b. human.	c. turtles.	d. crocodiles.
2	P	ut (🗸) or (X) :))		
- 1			avers of sediment	tary rocks are calle	ed sediments.
		3320		mentary rocks such	
Ī	2	and limestone.	iorried irom sedii	nertiary rooks such	(
	3	Wadi Al-Hitan ha	as always looked	as it does now.	í
			DESCRIPTION SHOWS		sence of fossils of large
-	7.	skeletons of wha	Decision of the second second	me due to the proc)
	5.	At Wadi Al-Hitan	, the oldest rocks	are found at the t	op of the lavers.
-	_				
3	C			by using the word	
		(la	yers – sediment	ary – whales – fo	rmation)
•	1.	Wadi Al-Hitan fo	rmed from	rocks as sands	stone and limestone.
0	2.	Among the fossi	ils that are preser	nt in Wadi Al-Hitan	are large skeletons
-		of			
-					

- 3. At Wadi Al-Hitan, the newest rocks are found at the top of the
- 4. Geologists called each separated rock layer in sedimentary rocks a
- 👩 Give a reason for the following :
- 1. Geologists study the layers of sediment in rock formations.
- 2. The oldest rock layers of Wadi Al-Hitan contain fossils of whales.
- S Look at the following picture, then complete the sentences below:



- 1. The oldest rock layers in this mountain are represented by number
- 2. The newest rock layers in this mountain are represented by number
- 3. If this mountain is found in Wadi Al-Hitan, so the rock layers number may contain fossils of whales skeltons.

Model Exam on Concept (4.2)

Total mark

1	(A) Choose the correct answer: 1. When a rock blocks the paths of fly	ing sand, a may be formed.	nam c	ksj
		c. valley d. canyon		
	 A canyon may be formed due to the a. erosion and deposition. weathering and deposition. Walls of canyons are characterized a. are very high. have great depth. Among the examples of sedimental is/are			
7	(A) Put (✓) or (X):		(5 ma	rks)
2	Both canyons and valleys often ha	ave river in their bottom.	()
	2. Wadi Rum in Jordan is an example		()
	3. Sand dunes are formed by erosion		()
	4. Rivers cause less erosion of rocks	s than small streams.	()
	(B) Give a reason for the following: The oldest rock layers of Wadi Al-	-Hitan contain fossils of whales.		*****
		······································		

3	(A) Write the scientific term of each	of the following:	(5 marks)
	 It is a special type of valleys which 	Its sides are steep.	()
	2. It is the process by which the wind	carves the rocks into diffe	rent shapes.
			()
	3. The two processes that have the n	nain role in the formation o	
			()
	4. They are scientists who study rock	S.	()
	(B) Correct the underlined words:		
	1. Deltas are formed by weathering p	rocess.	()
	2. <u>Dunes</u> are lowland areas which have	ve gently sloped sides.	()
4	(A) Complete the following sentence		OW: (5 marks)
		ecreases – hundreds)	
	1. Wind erosion can carve the		2
	2. Sand dunes are in continuous moti		
	3. When the force of wind,		long distance.
	4. Sand dunes may reach o	r meters tall.	
	(B) Look at the following pictures, th	en complete the sentence	es below :
		A valley icture (B)	A canyon Picture (C)
	If the water stream in picture period of time, the landform in picture The landform in picture merosion for a long period of time.	is passed through a flance in the image is passed through a flance in the image is a second in the image is a second in the image.	at land for a short
	3. The landform in picture ha	ave gently sloped sides.	

Assess Your Learning Questions of the School Book on Theme (4)

•	C	ho	0	s	9	•
•	C	no	O	s	6	:

1.	When a rock's surface is eroded de this indicates the occurrence of		ors such as air or water,
	a. weathering	b. deposition	
	c. transfer	d. erosion	
2.	Dissolving metals forming rocks is		
	 a. mechanical weathering. 	b. weathering by	wind.
	c. deposition in rivers.	d. chemical weath	nering.
3.	Which of the following indicates the process?	e occurrence of ch	emical weathering
	a. Water freezes and increases in	size, helping break	king down the rocks.
	b. Mixing the acidic water with roc		
	c. Trees' roots grow extensively in d. Collision of rocks between each	rocks cracks, lead	ing to their breaking down.
4.	What is the process in which the laweathering factors?	andforms change d	ue to
	a. Expansion.	b. Weathering.	
	c. Erosion.	d. Evaporation.	
5.	Which of the following is not an ex	ample of erosion?	
	a. The river carries the clay depos		
	b. The movement and accumulation	on of sand grains to	o form sand barrier.
	c. The sea waves transfer sand ar	nd soil crumbs from	the shore to the sea.
	d. The dissolving of minerals in ro	cks due to water th	at goes through it.
6.	When rocks break down into small process.	pieces, this indica	tes the occurrence of
	a. mechanical weathering	b. chemical weat	herina
	c. erosion by wind	d. erosion by wat	er
7.	The rapid flow of river water leads slows down, it transfers some sed	to erosion of parts	of the river banks. When
	occurs.		
	a. deposition b. erosion	c. weathering	d. transferring

8. Which of the following is an evi	dence of erosion ?
a. Sand dunes formation.	
b. Forming rocks crumbs.	
c. Nile River delta formation.	
d. Forming of sedimentary rock	S.
9. Which of the following is a cher	nical weathering factor ?
a. Growing roots of some plant	s between rocks cracks.
b. Water flow from a high slope	region on sedimentary rocks.
c. Variation of temperature, rais	sing and freezing point.
d. Falling of acidic rains on sed	limentary rocks.
10. Rush flow of water that carries	s sands during deposition process leads to
a. chemical weathering of lime	rocks.
b. smoothing rough edges of ro	ocks.
c. erosion of sedimentary rocks	s layers.
d. dissolving metals forming ro	cks.
11. Forming red rust in sedimenta	ry rocks is an evidence of occurring
process.	
a. erosion of sedimentary rocks	3
b. mechanical weathering	
c. chemical weathering	
d. transfer and deposit of crum	bs
12. Nile River Delta in Egypt is for	med due to process.
a. chemical weathering	b. erosion
c. mechanical weathering	d. deposition
13. "A great sea covers north of E the presence of	gypt since millions of years" is an evidence of
a. formation of the clay forming	Nile River Delta in Egypt.
b. rock formation of Wadi Al-Hit	
c. Formation of the colored vall	eys in Sinia.
d. formation of the Nile valley in	n Egypt.

14 140.5	indicates the eros	ion process?
14. Which of the following accurately	minto new shape	S.
a. Sands carve rocks changing the	em into non	
b. Sand dunes form a barrier to th	e Wind.	
c. Water can't move big rocks.	to prosion fac	ctors.
d. Accumulate of Earth's materials	due to erosion is	
 Most valleys are formed due to a. water deposition of many sedim 	nents and transferr	ing them far away.
b, chemical weathering of steep s	urfaces.	
c. water erosion of many sedimen	ts and transferring	them far away.
d. accumulation of clay in area wh	ere flowing water i	TIEBLS SLADIE WALEL.
16. Steep valleys formed due to follo	wing water erosior c. hills.	are called d. delta.
		avnt is due to the
17. The formation of sand dunes in E movement of	astern Desert III E	
a. floods. b. winds.	c. waves.	d. torrents.
18. A triangular landform formed from		and and clay that formed
a. canyon. b. delta.	c. sand dunes.	d valley
19. The oldest rocks layers in format	ion in Wadi Al-Hita	n include
a. Nile River Delta.		
b. turtles fossils.		
c. layers comprises animals' cave		
d. clay and sediment from soil laye	ers.	
20. Which of the following geological process ?	landforms are form	ned due to deposition
a. Wadi Al-Hitan and colored cany	ons.	
b. Wadi Al-Hitan and Nile River De	elta.	
c. Sand dunes and colored canyo	ns.	
d. Nile River Delta and colored car	nyon.	
21. At the convergence of flowing rive the sea, landform which is called	er water that carrie	s clay and sediments with
a. delta b. sand dunes	c. dams	d. canyons

22. Most canyons are for canyons ?	med due to erosion. What the first	step of forming		
 a. Water must move o to erode. 	 a. Water must move over rock formation that has cracked areas allowing rock to erode. 			
 b. The land must lie in down the rocks. 	an area with excess water, beside	humidity for breaking		
c. Water must freeze i	n the cracks of the rock for eroding	the rocks.		
d. A crack must be for	med in earth's crust to allow water	to follow through.		
23. Which of the following water erosion?	landforms is steep and formed du	e to power of flowing		
a. Plains.	b. Valleys.			
c. Canyons.	d. Mountains.			
24. The presence of sand are	d dunes or the deposits in a region	, tells us that they		
a. Eroded in their plac	e. b. weathered in their	place.		
c. eroded in another p	c. eroded in another place. d. weathered and eroded in their place.			
• Match :				
step in the following t	are shaped due to different proces able with the geological process re e correct order of their occurrence i	ferring to it. Then		
Geological process	Steps of forming landslides	Rearrangement		
1. Erosion :	a. Lichens grow producing acids that break down rocks running through them causing their loosing.	A. First step.		
2. Deposition :	b. Winds blow carrying a storm	B. Second step.		

2. Deposition :	b. Winds blow carrying a storm of sand and dust, and transfer them from place to another.	B. Second step.
3. Weathering:	c. Wind speed decreases to drop down sands and dust in a new area.	C. Third step.

26. The following pictures shows some of landforms. Each of them is an evidence of the occurrence of a geological process. Connect each process with its evidence occurrence.

1. Erosion by water:

b.

2. Deposits of river:

c.

3. Erosion and deposition due to wind:



SCIENC Assessment Book

By A Group of Supervisors



الممسوحة ضوئيا بـ CamScanner

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Self-Assessments

on Concept (3.1)

Self-Assessment 1 on Lesson 1

(A) Put (V) or (X):					
1. The Mars rove	Curiosity converts so	ound energy into kinetic energy.	,			
2. Mars rover Cu	riosity can be operate	d from a distance	(
3. The stored en	Mars rover Curiosity can be operated from a distance. The stored energy in batteries is the light energy.					
	n for the following:	ng.n onorgy.				
		atteries for its operation.				
	oco the surnight and p	atteries for its operation.				

(A) 180 la al			***************************************			
	entific term of each o					
	rce of energy on the E		(
		the battery of a remote				
controlling toy			(
	ontrolled vehicle used	to explore the surface of				
planet Mars.			(
	oosite figure, then cho	ose the correct answer:				
a. water	b. wood		COL			
c. fuel	d. energy		6			
2. To keep plavi	ng with the toy car who	en				
	ns out, we have to	E TANK TO THE PARTY OF THE PART				
the battery ru	ns out, we have to	E TANK TO THE PARTY OF THE PART				
the battery ru or recharge th	ns out, we have to he battery.	E TANK TO THE PARTY OF THE PART				
the battery ru or recharge the a. heat c. replace	he battery. b. cool d. freeze	E TANK TO THE PARTY OF THE PART	nergy.			

Self-Assessment 2 till Lesson 2

1. When you rub your hands together, the consumed energy is while the produced energy is energy. 2. The produced energy in a toy car is energy and sound energy. energies in a hair dryer are energy and sound energy. 3. The produced energy from coal when burned is energy, that converted into energy used to operate the machines of electropower stations. (B) Give a reason for the following: The thermal energy produced from burning coal is used in some electric postations.	d is ric	у.
(A) Put (V) or (X): 1. Curiosity robot needs sound energy to be operated.		_
Curiosity robot needs sound energy to be operated. The electric lamp is the primary source of most energies on the Earth.	()
The electric iron converts electrical energy into thermal energy.	()
The state of the s	,	,
(B) What happens to? The change of energy when you press on the spring of the soap dispense		
B Look at the opposite figure, then complete the following sentences :		
This living organism can convert energy of the Sun into energy stored inside it.		
2. If the wood of this organism is burned, energy is produced.		
After death and burying of this organism over millions of years, it becomes coal that stores	a disabili	

4. The formed coal can be used in electric power stations to generate

energy.

Self-Assessment 3 till Lesson 3

A) Choose the correct and	swer:
. Mars rover Curiosity use	es to be operated.
a. solar energy and elec	ctrical energy
b. solar energy and ther	rmal energy
c. electrical energy and	thermal energy
d. electrical energy and	sound energy
2. While playing a drum,	energy is converted into energy.
a. sound - kinetic	
b. sound - light	
c. kinetic – sound	
d. kinetic – light	
In a bicycle, a part of k the friction of its tires w	inetic energy is converted into energy due to with the road.
a. sound	b. thermal
c. light	d. chemical
(B) What happens to?	The property of the second of
The change of energy wi	ion you rub your riands together.
The change of energy wl	non you rub your namus together.
The change of energy wl	non you rub your names together.
(A) Correct the underlin	
(A) Correct the underlin	
(A) Correct the underlin 1. Energy can neither be	ed words: e created nor destroyed, but only converted from one form
(A) Correct the underlin 1. Energy can neither be to another, this is the	ed words: e created nor destroyed, but only converted from one form law of consuming of energy. y while burning some pieces of wood is the thermal
(A) Correct the underlin 1. Energy can neither be to another, this is the 2. The consumed energy energy.	ed words: e created nor destroyed, but only converted from one form law of consuming of energy. y while burning some pieces of wood is the thermal
(A) Correct the underlin 1. Energy can neither be to another, this is the 2. The consumed energy energy.	ed words: e created nor destroyed, but only converted from one form law of consuming of energy. y while burning some pieces of wood is the thermal (

El Look at the following figures, then complete the following sentences:









Device (1)

Device (2)

Device (3)

Device (4)

- The electrical energy used to operate devices number

 and
- 2. Kinetic energy is produced in devices and

Self-Assessment 4 till Lesson 4

۰	(A)	Complete	the	following	sentences :
---	-----	----------	-----	-----------	-------------

- The output energy of burning coal is energy, which is used to produce energy in electric power stations in order to generate electrical energy.
- The output energy that helps the washing machine to do its main function is energy, and this energy is considered the energy of the hand bell.
- 3. The input energy of the toy car is energy that is stored in its battery and then converted into energy in its wires to operate its motor.

(B) Give a reason for the following:

Sound energy and thermal energy are considered as wasted energy in the vacuum cleaner.

(A) Write the scientific term of each of the following:

- 1. The input energy of a television.
- 2. The wasted energy in a computer.
- 3. The output energy of the washing machine which helps it do its main function.

(B) Mention t	the input and	output	energies of	the opposite devi	ce;
---------------	---------------	--------	-------------	-------------------	-----

1. Input energy:





Electric iron

El Look at these electric devices, then complete the following sentences :







Device (2)



Device (3)

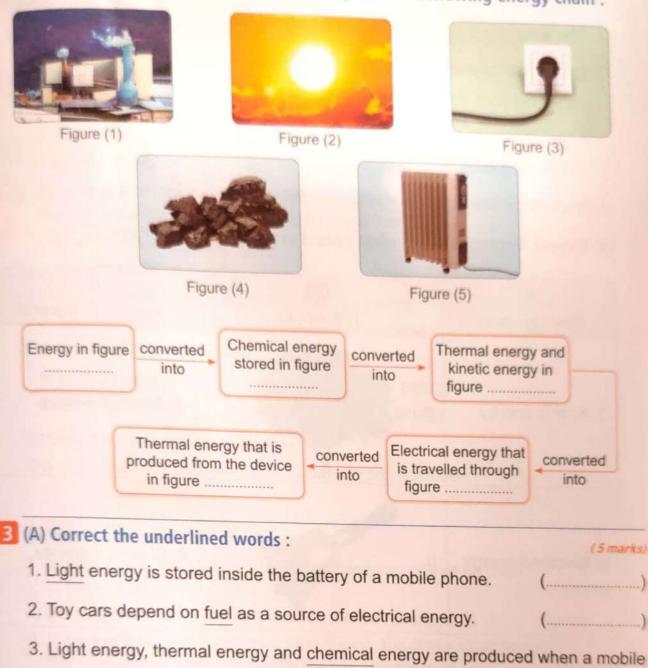
- 2. Kinetic energy is produced in devices number and
- All of these devices are operated by energy that is transmitted from stations through wires.

Model Exam

on Concept (3.1)

1	(A) Choose the correct answer	1	50	1
-	1. Mars rover Curiosity is desig	ned to explore the	(5 mg	
	a. planet Earth.	b. planet Mars.		
	c Sun.	d. moon.		
	is stored inside the plant in a	ne form of sugar. b. electrical	y which	
	a. sound	d. kinetic		
	c. chemical			
	3. When a piece of coal is burne	ed, energy is produced.		
	a. thermal	b. kinetic		
	c. sound	d. potential		
(energies. a. sound – light b. sound – thermal c. kinetic – light d. light – thermal B) What happens if? You put your hands near a lighted	d lamp.	***************************************	
	A) Put (V) or (X):		(5 marks	(3
1	. There is stored chemical energy	y inside the food we eat.	()
2.	The input energy in a hair dryer	is the chemical energy.	()
3.	As a result of friction between be changes into chemical energy.	ike's tire and the road, kinetic energy	()
A	Ma ann annied the este	interest forms of anorgy		6

(B) Look at the following figures, then complete the following energy chain:



(B) Give a reason for the following:

phone is used.

forms of energy.

When you press on the spring of soap dispenser, the soap moves upward.

4. The solar energy produced from the moon can be converted into different

(according to the change of energy).

.....)

(A) Write the scientific term of each of the following:

- 1. The energy that is used to operate a television.
- Energy can neither be created nor destroyed, but only converted from one form to another.
- A kind of energy that is produced from the electric heater and burning coal.
- 4. The energy produced from playing guitar.

(B) Choose from column (A) what suits it in both columns (B) and (C):

(A) Energy used	(B) The device	(C) Energy Produced
1. Kinetic energy	a.	A. Thermal energy.
2. Electrical energy	b.	B. Chemical energy.
3. Solar energy	c.	C. Sound energy.

1.

2.

3.

Self-Assessments

on Concept (3.2)

Self-Assessment 5 on Lesson 1

(A) Choose the correct answer:				
1. To move a car, the fuel must be	the car engine at first.			
a. freezed inside	b. cooled inside			
c. burned inside	d. removed from			
On driving a car for a very long describes the most important thin a. The presence of passengers. b. The presence of a radio.		tences		
c. The fuel tank is completely filled	ed with gasoline.			
d. The fuel tank contains a little a	amount of gasoline.			
3. On burning fuel, we obtain				
a. sound energy.	b. potential energy.			
c. electrical energy.	d. thermal energy.			
(B) Give a reason for the following	a:			
The importance of wood and coal a				

5 (A) Dut (() ov (V)		-		-
2 (A) Put (V) or (X):	urning gooding connet be used			
 Energy that is produced from but to move a car. 	drning gasoline, cannot be used		-)
Burning of all forms of fuel prod	uces thermal energy		()
	uring driving, the driver must stop at			-
the nearest fuel station to suppl			()
(B) Mention three different forms				
(b) Wendon three different forms	of fuel.			
			******	****
3 Put each of the following words [The Sun – Wood	in front of the suitable sentence : - Gasoline - Thermal energy]			
	different means of transportation.	(*****)
2. It is a form of fuel that is used in		(******)
3. It is a form of energy which is p		(******)
4. The main source of most energ	gies on the Earth's surface.	()
				12

Self-Assessment 6 till Lesson 2

(A) Choose the correct ansv	stad by
Car engines can be opera	b. coal and wood.
a. coal only.	d. gasoline and natural gas.
c. gasoline only.	
2. Fossil fuels were formed o	under the Earth's surface from dead plants or animals of time.
after a period o	c. very long d. long
a. very shortb. short3. The two main types of fuel	
	b. water and wind
a. wood and coal.	d. fossil fuels and biofuels
c. the Sun and the moon.	
(B) Give a reason for the following	owing:
Biofuel is considered as a ren	newable fuel.
(A) Put (V) or (X):	
Coal can be used to produce	ce electrical energy.
2 Coal gasoline and wood are	e considered as renewable resources of energy. (
3 The nonrenewable resource	es of energy include coal, gasoline and water.
(B) What happens if?	to the Forth's surface over millions of years
Sea creatures were buried und	der the Earth's surface over millions of years.
Choose from column (B) what	suits it in column (A):
(A)	(B)
Form of fuel	We can get it from
1. Wood	a. wood chips and grass.
2. Oil	b. cutting of trees.
3. Coal	c. decomposition of sea creatures underground.
4. Liquid biofuels	d. decomposition of plants remains underground.
	e. boiling water.
1 2	3
L	J

Self-Assessment 7 till Lesson 3

The same of the sa	A STATE OF THE PARTY OF THE PAR	
(A) Choose the correct answer	r:	
1. To produce steam inside the	e electric power station, we have to	
	b. freeze water.	
c. heat water.	d coal fuel	
The devices in the electric paralled	power station which operated by ste	eam are
a. generators.	b. turbines.	
c. tubes.	d wires	
3. The generator inside the ele	ectric power station, turns	
a. water into steam.	b. steam into water	***
c. electrical energy into kine	etic energy.	
d. kinetic energy into electri	ical energy.	
(B) What happens if?	3).	
A generator in an electric pow	ver station is demand	
2 2.1 electric pow	rei station is damaged.	
7 (A) Park (d) (c)		************************
2 (A) Put (V) or (X):		
1. When fuel is burned, it prod	duces thermal energy.	()
2. Turbines convert kinetic en	nergy into electrical energy.	()
The electrical energy produ	uced from electric power station	
can be used in houses, str	eets and factories.	()
(B) Complete the following s those between brackets:	sentences by choosing the correct	answer from
Fossil fuels are [nonrenew used to generate electrical	rable – renewable] resources of end	ergy which can be
2. Turbines in electric power	stations are operated by the effect	of [steam - sand].
	om electric power stations to house	
stations. Put each of the following	how electricity is generated in el lowing words in front of its suitab Steam – Turbine – Generator]	
1. Its movement produces ki	netic energy.	()
2. It changes kinetic energy		()
3. It is a type of nonrenewab		()
4. It is resulted from heating	the water and it turns turbines.	()

(A) Choose the correct answer. 1. When carbon dioxide gas in air increa 2. All forms of fossil fuel are formed 2. All forms of fossil fuel are formed 3. above the Earth's surface. 4. a above the water surface. 5. above the water surface. 6. above the water surface.	under the Earth's surface. in the air around us. from
a. global warming. c. acid rain. (B) Give a reason for the following: Burning of coal and oil causes the increa	
(A) Put (V) or (X):	(
. A .: J rain Causes 9.	ices acid rain.
1. Acid rain causes global warming. 2. Mixing of water with oxygen gas produce. 3. Acid rains have negative effects on book. (B) What happens to? The people's health if they live in a city the people's health if they live in a city the content of the people is health.	
Scientists do some experiments to know sources of pollutions on living organism Match each experiment with its correct	v the bad effects of some different s. observation :
The experiment	The observation
1 Exposing a dog to cars smog for	a. its leaves turn brown and it will die.

The experiment

1. Exposing a dog to cars smog for a few minutes

2. Placing a building rock in a cup contains a sample of acid rain for a long period of time

3. Watering a small plant with acid rain for a week

The observation

a. its leaves turn brown and it will die.

b. irritation of its eyes and lungs.

c. it will decompose into small rocky particles.

Self-Assessment 9 till Lesson 5

1	(A) Choose the correct answer:						
The energy that originally causes the formation of fuels is							
	a. wind energy.						
	C. Solar energy	b. water energy.					
	2. As the time passes, the amount of coal will						
	a. increase.						
	c. remain constant.	b. decrease.					
	3. Burning of fossil fuels produces	d. increase then decrease.					
	a. only gases that pollute the air.						
	b. only thermal energy.						
	c. gases that pollute the air and sol	ar energy					
	d. thermal energy and gases that p	Ollute the air					
	(B) Give a reason for the following:	ondic the all.					
	Burning fossil fuels causes global war	il remotion par see regarded					
	wal	rming.					
1			******	*****			
2	(A) Put (V) or (X):						
	1. Renewable forms of fuel can be re	placed faster than nonrenewable					
	forms of fuel.		()			
	2. Burning of fossil fuels produces ga	ses that don't cause global warming.	()			
	3. Burning coal releases gases which	cause air pollution.	()			
	(B) What happens to?						
	The Earth's temperature if the amour	nt of gases produced from burning of fo	ssil				
	fuels increases to very high limit.						

3	Complete the following paragraph I	ov using the following words:		-			
Ĭ		- heat - raises - gases]					
		els is that when they are burned, they re	elea	se			
	The second secon	ipin the atmosphere, which					
	the temperature on the Earth, that can			e.			

Model Exam

on Concepts (3.1) & (3.2)

A A Comment to the Comment of the Co	and the could be a second		
A form of biofuels which is	can be used in warming houses and cooking	(5)	
a. wood.	b. wind.	1009	
c. water.	d sand		
You feel warm when you converts into thermal energy	rub your hands together, because ergy.	nerav	
a. kinetic	b. light	9,	
c. electrical	d. sound		
All the following are from a. the death of trees.	the harmful effects of acid rain, except	****	
b. the change in the chen	nical nature of soil.		
c. the increase in the Earl	th's temperature.		
d. the change in the chem	nical nature of lakes.		
4. A form of fossil fuels that is	was formed from the decomposition of plant	remair	15
a. wind.			
a. WIIIU.	b. coal.		
c. wood.	b. coal. d. sand.		
c. wood.	d. sand.		
c. wood. (B) Give a reason for the fol	d. sand.		
c. wood. (B) Give a reason for the fol	d. sand.	other.	
c. wood. (B) Give a reason for the fol	d. sand. lowing: needs a battery to move from one place to ar	*********	***
c. wood. (B) Give a reason for the fol A remote controlled toy car n	d. sand.	**********	++
c. wood. (B) Give a reason for the fol A remote controlled toy car not controlled toy car not controlled toy car not controlled toy car not controlled toy.	d. sand. lowing: needs a battery to move from one place to ar	*********	++
(A) Put (V) or (X): 1. Grass and wood chips can	d. sand. lowing: needs a battery to move from one place to ar	**********	++
(A) Put (V) or (X): 1. Grass and wood chips can 2. When pedalling a bike, the into kinetic energy. 3. The movement of a turbine	d. sand. lowing: needs a battery to move from one place to an one be used to make a liquid fuel.	**********	++
(A) Put (V) or (X): 1. Grass and wood chips can 2. When pedalling a bike, the into kinetic energy. 3. The movement of a turbine chemical energy.	d. sand. lowing: needs a battery to move from one place to an one be used to make a liquid fuel. chemical energy in your body changes in the electric power station produces	**********	**
 (B) Give a reason for the fold A remote controlled toy car in the fold A rem	d. sand. lowing: needs a battery to move from one place to an one be used to make a liquid fuel. chemical energy in your body changes in the electric power station produces	**********	++
(A) Put (V) or (X): 1. Grass and wood chips can 2. When pedalling a bike, the into kinetic energy. 3. The movement of a turbine chemical energy.	d. sand. lowing: needs a battery to move from one place to an one be used to make a liquid fuel. chemical energy in your body changes in the electric power station produces inside different devices.	**********	++

(A) Writ	e the scientific term of each of the following:	0	5 marks)
1. The n	main source of most forms of energy on the Earth's surface.	()
2. The e	energy stored inside the coal.	()
3. The e	energy resources that include wind energy, water and solar e	nergy.	
		()
(B) Corr	rect the underlined words:		
1. The	amount of biofuels cannot be replaced as quickly as it is use	d.	
)
2. Curio	osity is a robotic vehicle that is designed to explore the surfa-	ce of mo	on.
		()
(A) Cor	mplete the following sentences :	(5 marks)
1. The that	change of electrical energy into sound energy in the radio is proves the law of	an exam	iple
2. The ener	generator in the electric power station changes energy.	gy into	
3. In a	ny energy chain, some of the energy is wasted in the form of		
	oose from column (R) what suits it in column (A)		

(A)	(B)
1. Oil	a. it is a form of biofuels that is made from wood.
2. Charcoal	b. it is formed when oxygen gas combines with water.
3. Acid rain	c. it is a form of fossil fuels that was formed from the decomposition of sea animals.
	 d. it is formed when carbon dioxide gas combines with water in the air.

Self-Assessments

on Concept (3.3)

Self-Assessment 10 on Lesson 1

(A) Choose the corr	
1. The solar panels	energy that is used
light up lamps of	used.
a. thermal	
c. electrical	
2. All the following a	le energy resources,
except	
a. coal.	
c. natural gas.	1.
3. Wind turbines ger	sed to operate all the following
devices, except	
a. television.	ender.
c. hair dryer.	The state of the s
(B) Give a reason fo	
Modern water turbin	S.
241244	
(A) Put (V) or (X):	
	e energy resources. (
2. Water is used to d	
3. Hundreds of years	crush grain to make flour. (
(B) What happens if	
(b) what happens if	

Look at the figure,	then complet	e the following	sentences:
---------------------	--------------	-----------------	------------

- 2. The energy used to operate the device number

 (1) is considered a energy resource.
- Device number ② represents a lamp that produces energy and energy.



Self-Assessment 11 till Lesson 2

(A) Choose from column (B) what suits it in column (A):

(A)	(B)
Wind turbines Solar panels Water turbines	 a. generate electricity by using the kinetic energy of running water. b. generate electricity by using sound energy. c. generate electricity by using solar energy. d. generate electricity by using the kinetic energy of moving air.

(B) Give a reason for the following:

Some electrical devices have solar panels.

2 (A) Correct the underlined words:

- We can use <u>straight</u> mirrors to direct sunlight onto metal pots to heat them for cooking.
- 3. Wind turbines convert kinetic energy into light energy. (.....)

(B) What happens if ...?

Radiant energy that comes out of the Sun enters the greenhouses.

			•	
\mathbf{n}	31	rT		
-	d١			

Late the following sentences		
Look at the opposite picture, then complete the following sentences 1. The name of this glass building is 1. The idea of working of this glass building 2. The idea of working of this glass building depends on collecting the energy depends on collecting the energy coming from the Sun. 3. The received energy is converted into energy that warms the inside of this building. 4. In the cold regions, this building allows farmers to plant crops that only grow in elimates. Self-Assessment (12) till Lesson 3		The state of the s
Self-Assessment (1)		
1. Radiant energy is used to generate electricity directly by using	eases.	S
(B) Give a reason for :		
(B) Give a reason for . Farmers use greenhouses to plant crops that grow in warm climates.	***************************************	
2 (A) Put (V) or (X):		
Solar panels are used to generate sound energy in some types of street lamps.	()
2. When the kinetic energy of wind that is applied to the wind turbines		\
increases, they produce more electricity.	(1
3. Both solar panels and natural gas are renewable energy resources.	()
(B) What happens if?		
The kinetic energy of wind applied to the wind turbines decreases.		

If the two wind turbines in front of you are affected by the different wind forces.

Answer the following questions:

Weak wind



Wind turbine (A)

Strong wind



Wind turbine (B)

- 1. Which wind turbine spins faster ? (Give a reason for your answer).
- 2. Which wind turbine generates less electrical energy?

Self-Assessment 13 till Lesson 4

- (A) Choose the correct answer:
 - - a. electrical

b. light

c. chemical

- d. potential
- 2. All the following can be done by the effect of solar energy, except
 - a. warming houses.
- b. cooking food.
- c. producing sound from a hand bell.
- d. producing light in a light post.
- Water turbines can generate more electricity by increasing the
 energy of water that is stored behind dams.
 - a. light

b. sound

c. thermal

- d. potential
- (B) Give a reason for the following:

Water turbines in dams are used to generate electricity.

Part 1

of each of the following:	
(A) Write the scientific term of each of the following: 1. A building that is built across rivers to control the water flow and	
1 A building that is built across	(
increase its potential energy. 2. A glass building that is used in cold areas to plant crops which grow	in
2. A glass building that is used in	(
warm climate. 3. An energy that is produced from water turbines and is transmitted the second devices in houses.	rough
devices	
(B) Mention two devices that use solar energy to be operated, then energy transformation in each one of them.	mention the
//	***********
1. Device (1) Changes of energy:	Coverence of the Country of the Coun

Changes of energy:	
Look at this picture that shows the High Dam that was built at Aswayears ago, then put () or (X) in front of the following questions: 1. The stored water behind this dam has potential energy. 2. The flow of water through this dam can be controlled. 3. When water is released, it flows through wind turbines in the dam. 4. When turbines rotate in the dam, electrical energy is generated.	Third in the second sec
Self-Assessment 14 till Lesson 5	
(A) Correct the underlined words :	
The energy that is produced by <u>wind</u> turbines is called hydroelectric energy.)
2. Wind turbines produce more electricity when the wind blows	
with more potential energy. ()
3. Greenhouses convert radiant energy coming from the Sun into light e	nergy that
is used to plant crops which grow in warm climates. ()

(B) What happens if?	
The kinetic energy of wind applied to wind turbine increases.	
AND THE PROPERTY OF THE PROPER	
(A) Cross out the odd word :	
1. Water - Wind - Coal - Sun.	()
2. Solar car - Hand mixer - Solar panel - Greenhouse.	()
3. Gasoline - Coal - Natural gas - Wind.	()
(B) Compare between water turbines and solar panels in t	he table below

Points of comparison	Water turbines	Solar panels
Source of energy that is used to operate it:	***************************************	************
2. The produced energy :	energy.	energy.

3	Look	at	the	figure,	then	put	(V)	or	(x)	
---	------	----	-----	---------	------	-----	-----	----	-----	--

1.	Water in the area (A) can be used in rotating	water	
	turbines.	()
2.	Water in the area (A) has no kinetic energy.	()
3.	Water in the area ® may evaporate in the		
	presence of sunlight.	()
4.	When water in both areas (A) and (B) evapor	ates, i	t
	never returns back to the river.	()



Model Exam

on Theme (3)

Tota		
	100	try.
_		
-	20	

(A) Complete the following sentences:

- Remote controlled of toy cars changes into energy which is used to energy which it is used to energy which is used to ene energy that in turn changes into energy which is used to move the car.
- 2. When you rub your hands together, the energy is converted into
- 3. Coal, and can be used in generating electricity.
- 4. Wind turbines and windmills use the energy of to be powered.

(B) Put (V) in front of the pictures that can use solar energy to do its work :



Bell



Hand mixer



Greenhouse



2 (A) Put (V) or (X):

(5 marks)

- 1. We have to reduce the usage of the Sun as a source of energy.
- 2. As a result of global warming, the temperature on the Earth increases.
- 3. Both wind movement and water flow have kinetic energy.
- 4. In the soap dispenser, potential energy changes into kinetic energy.

(B) Give a reason for the following:

The importance of generators in electric power stations.

3	(A) Write the scientific term	n of each of the following:	(5 marks)				
	1. A panel designed to absor	rb sunlight to generate electricity.	()				
	2. It is any substance which	produces thermal energy on burning.	(,,,,,,,,,,,,,,,,,,,,,,,,)				
	3. A robotic vehicle which is	designed to explore the surface of Mars.	()				
	4. The energy used when p	laying a drum.	()				
	(B) What happens to?						
	The car movement when th	e fuel runs out.					

	(A) Correct the underlined						
4	(A) Correct the underlined		(5 marks)				
	The Moon is the main source of both biofuel and fossil fuel.						
	Manual mixer depends on electricity to do its function.						
	3. After death of living organisms, their remains are buried under						
	the Earth's surface and	exposed to extreme pressure and cool.	()				
		els that is used in warming houses.	()				
) what suits it in column (A) :					
		, and the second of the second					
	(A)	(B)					
	1. Solar water heater	a. the energy that is used by wind turbin	es.				
	2. Light energy and	b. use the energy of the Sun to heat wat	er in homes.				
	thermal energy	c. are the two main forms of energy prod	duced from				
	3. Electrical energy	the Sun.	Application L				
		d. is the form of energy produced from s	solar panels.				
	1	2					

Self-Assessments

on Concept (4.1)

Self-Assessment 15 on Lesson 1

On Lesson
(A) Correct the underlined words:
The deep valley that is carved by following water, is know as coastal rock.
2. The force of water and wind cause artificial erosion.
3. Canyons are formed due to fast changes.
(B) What happens when?
Water flows for many years between mountains.

2 (A) Put (V) or (X):
Both of sandcastles and canyons can be formed in few hours.
There are some similarities between sandcastles and coastal rocks.
3. Canyons have sloping at sides like that of coastal rocks.
(B) Give a reason for the following:
Sandcastle on a seashore may disappear in few minutes.
, pp-1or minutes.
3 Complete the fellowing and the second seco
Complete the following sentences using the words below:
(minutes – slow – years – fast)
Formation of coastal rocks and canyons takes many, so this is considered as changes.
2. Disappearance of sandcastle on a seashore takes few, so this is
considered as changes.
Colf Access 400 mm
Self-Assessment 16 till Lesson 2
1 (A) Correct the underlined words :
The movement of sediments from one place to another, is know as deposition. (
Weather is the breaking down of rocks on Earth's surface into tiny pieces. (
3. Plant leaves grow inside the cracks of rocks which become wider. (

(A) Put (V) or (X):		
1. Water may cause mechanical and chemic	cal weathering.	(
Chemical weathering could occur due to lichens or present in some rains.	the acid that is produced from	(
3. Limestone caves are formed due to friction	on between sand and rocks.	(
(B) Give a reason for the following:		
Plant roots play an important role in mecha	nical weathering.	

Classify the following examples in the tal	ole below :	
1. Rusting of an iron statue.		
2. Formation of limestone cave.		
3. Break down of rocks by plant roots.		
4. Break down of a rock statue by wind.		
5. Break down of rocks by acid rain.		
6. Dissolving minerals of rocks by acids o	f lichens.	
Mechanical weathering	Chemical weathering	
	-	

Self-Assessment 17 till Lesson 3

2. The shape and rusting process 3. Limestone cave	ce of biscuit by hand nering. structure of an iron as formed withen few for the following:	ds can represent a type of statue are changed due to w hours. antacid considered as a chemical weather
2. Chemical and me freezing turned in 3. If the color of a st both types of (B) What happens if	thering makes greated the chanical weathering ito ice. The changes and it it is the change and it is the change and it	ter changes than weathering. In g can be caused by which on It is broken into small pieces, this means water containing antacid.
Classify the followin 1. Wind. 4. Temperature. Factors cause mech	2. Water. 5. Plant roots	ing weathering in the table below: 3. Acids. ts. 6. Oxygen gas Factors cause chemical weathering

Self-Assessment 10 till Lesson 4	
1 (A) Correct the underlined words: 1. Weathering process followed by deposition process in reshaping Earth's surface. 2. Sand grains can be carried for a short distance by strong wind. 3. When many layers of sediments pressing down each others over a long period of time, sand dunes are formed.	()
(B) Give a reason for the following : Sedimentary rocks are formed over a long period of time.	
(A) Put (V) or (X):	
1. You can see the reshaping of Earth's surface during its occurance	e. (
If there is no erosion process, there is no deposition process in another place.	(
3. Sedimentary rocks are present in the bottom of oceans, lakes	
and in deserts.	(
(B) What happens when?	
The gravity acts on broken weathered rocks at the top of a mountain	in.
Study the following two figures of sand grains, then put (🗸) or (X	() below :

3



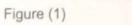




Figure (2)

1	- 2
()
()
()
()
	31
	(((

Self-Assessment 19 till Lesson 5 (A) Correct the underlined words: 1. Small hills of sand found in a desert are known as sedimentary rocks. Erosion process means that wind or water break down rocks. Erosion process is usually followed by weathering process. (B) Give a reason for the following: If there is no erosion process there is no deposition process in another place. (A) Put (V) or (X): 1. After deposition of eroded materials it may wear down again by wind or water. 2. Erosion and deposition are two linked processes. 3. Both of small sand dunes and sedimentary rocks need few days to be formed. (B) What happens if ...? Weathering process doesn't occur.

Study the following two figures, then put (V) or (X) below:



Figure (1)



Figure (2)

- 1. Figure (1) represents a triangle-shaped delta.
- 2. Figures (2) occurs due to the deposition of sediments and mud in a desert. (
- 3. Formation of figure (1) takes longer time than formation of figure (2).
- 4. Water erosion play an important role in formation of sand dunes that present in figure (2).

Model Exam

on Concept (4.1)

		THEA	m	2,811	
	1				
-20	1				
20	1				
20		_	_	-	

-				
1	(A) Write the scientific term of eac	h of the followin	ig:	(5 marks)
	1. The disappearance of a sandcast	le as a result of it	s hitting	
	with the sea waves.			()
	2. It is a type of caves that is forme		d minerals of	
	rocks combine again in new sha	pes.		()
	3. Process in which the moving sec	diments are drop	ped in	
	a new place.			()
	4. A hill of sand created by the wind	d.		()
	(B) What happens if?			
	A red-colored rust is formed on so	me rocks.		
2	(A) Choose the correct answer :			(5 marks)
	1. As a result of breaking down of	, sand	d is formed.	
	a. rubber b. plastic		d. glass	
	2. The breaking of rocks into sma	ller particles with	out changing thei	r properties is
	called			i della
	a. mechanical weathering.	b. chemical	weathering.	
	c. deposition.	d. erosion.		
	3. The deep narrow valley with sl	opes at its sides	and often with wa	ter stream
	flowing through it is known as	a		
	a. canyon. b. mountain.	c. hill.	d. river.	
	4. Lichens produce or	rocks that dissol	ve minerals found	I in these rocks.
	a. oxygen b. acids	c. water	d. rain	
	(B) Give a reason for the follow	ing :		
	Water play an important role in t	he formation of li	mestone caves.	

3 (A) Put (V) or (X):	(5 marks)
1. All changes that occur on the Earth's surface take hundreds of years.	(
2. There are many types of sediments like sand, rocks and soil.	()
 Roots of plants can slowly grow over time through small cracks in rocks causing chemical weathering. 	()
4. Water can cause the two types of weathering.	()
(B) Complete the following sentences by using the words between brack (rocks – wind – water)	ets :
Air moving from an area to another and has a role in breaking down of rount into smaller particles is known as	ocks
2. The shape of coastal rocks is affected by the forces of and will	nd
The origin of sand is the breaking down of some types of	nu.
3. The origin of sand is the breaking down of some types of	(5 marks)
3. The origin of sand is the breaking down of some types of	
3. The origin of sand is the breaking down of some types of	
3. The origin of sand is the breaking down of some types of	(5 marks)
3. The origin of sand is the breaking down of some types of	(5 marks)
3. The origin of sand is the breaking down of some types of	(5 marks) ers at
3. The origin of sand is the breaking down of some types of	(5 marks) ers at

Self-Assessments

on Concept (4.2)

Self-Assessment 20 on Lesson 1

(A) Choose	the	correct	answer:
------------	-----	---------	---------

has brown and black colors.

- a. The Small Canyon
- b. Wadi Nakhr
- c. The Colored Canyon
- d. Wadi Rum
- 2.are formed by the effect of water stream.
 - a. Mountains

b. Dunes

c. Hills

- d. Canyons
- 3. Rivers can make new lands from sediments by the effect of ______ process.
 - a. mechanical weathering
- b. chemical weathering

c. deposition

d. erosion

(B) Give a reason for the following:

The sides of canyon at the beginning of its formation are gently sloped.

(A) Put (V) or (X):

- 1. Canyons are formed due to erosion by water for a short period of time.
- 2 There is no trees or plants grow on the both sides of a canyon at
- the beginning of its formation.
- 3. The wall of canyons may be eroded by the effect of a river movement.

(B) What happens if ...?

More of rain water is running through a small canyon again.

3 Look at the following pictures, then complete the sentences below:



Picture (A)



Picture (B)

1. Rains in picture can turn the flat land into the landform that is present in picture

2.	If a lot	of rain fa	alls on th	e landform	in picture	, its	gently	sloped	sides
	will ge	t deeper.				 and fo	rm a ri	VOP	

3. Water in picture ____ can gather in one stream and form a river,

Landform in picture is considered as a small canyon at the beginning of its formation.

Self-Assessment 21 till Lesson 2

(A) Choose from column (B) what suits it in column (A):

(A)	(B)
Rounded and small rocks Mudslide	 a. is a special type of valleys that has steep sides. b. are formed due to the effect of deposition process. c. is a landform that is formed quickly due to flooding of rain. d. are formed due to the effect of weathering process

(B) Give a reason for the following:

Canyons may be formed as a result of river streaming.

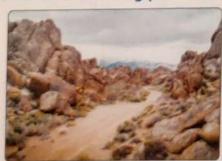
(A) Correct the underlined words :

- 1. Canyons can take hundreds of years to be formed.
- 2. Big streams cause more deposition than small streams.
- 3. Canyons are example of fast changes of landscapes.

(B) What happens if ...?

The fast flow of water eroded a lot of sediment of a mountain and carry them away for a long period of time.

El Look at the following pictures, then choose the correct answer:



A mudslide Picture (A)



A canyon Picture (B)

The landform which represent a very quickly change in the landscape is present in

(Picture (A) – Picture (B))

2. The landform which takes a long period of time to be formed is present in (Picture (A) – Picture (B)) 3. Both landforms are created by the effect of processes. (weathering and erosion – erosion and deposition) Self-Assessment (22) till Lesson 3
Sen-Assessment 22 till Lesson 3
(A) Choose the correct answer :
1. Nile River Delta is formed due to process.
a. chemical weathering b. mechanical weathering
c. erosion d. deposition
Most are formed by the effect of water erosion of many sediments and transferring them away.
a. deltas b. mountains c. valleys d. dunes
3is a steep valley that is formed due to flowing of water streams
a. Canyon b. Sand dune c. hill d. Delta
(B) Give a reason for the following: Plants that grow in the wetlands of deltas have an important role in formation of those deltas.
2 (A) Correct the underlined words :
Deltas are formed by weathering process.
Dunes are lowland areas which have gently sloped sides.
3. Small canyon is formed due to the flowing of wind through the flat land.
(B) What happens if?
The speed of the river water decreases.
Look at the opposite figures, then answer the question below :
Do you think that a delta will form in the area (A)?
(Give a reason for your answer)
Coean

Self-Assessment 23 till Lesson 4

-					-	
8.0	(A) Complete	the full continue	sentences using	the	words	below:
-	And comblete	the following	sentences using	file	AACUTON	MA SOLITON A. A.

(decreases - erosion - increases)

- 1. Wind in desert can change the shape of rocks by process,
- 3. When the amount of rainwater, the sides of canyon may get deeper

(B) Give a reason for the following:

Sometimes we can observe sand dunes in front large rocks of desert.

2 (A) Put (V) or (X):

- 1. Dunes are special type of valleys which is formed due to wind erosion.
- 2. Deltas may contain fertile soil which is suitable for cultivating many crops. (
- Canyons are formed by weathering and erosion of rocks for a long period of time.

(B) What happens to ... ?

The sand in a desert when wind blows by a great force.

El Complete the sentences below pictures to show how these landforms are formed by writing "weathering process, erosion process or deposition process":



A Canyon

1. and
processes.



A Delta

2. process.



A Sand dune

3. and processes.

Self-Assessment 24 till Lesson 5

(A) Choose the correct answer :			
1. Formation of in East	ern Desert in Egypt is due to	the movement	of
winds.			
a. valleys b. canyons	c. sand dunes d. delti	as	
2. The oldest rock layers in Wadi A	I-Hitan include all the followin	g, except	
a. skeleton of sea cows.	b. skeleton of giraffes.		
c. large skeleton of whales.	d. skeleton of crocodiles.		
3. Among the landforms that depe	end on deposition process in	their	
formation are			
a. sand dunes and deltas.	b. canyons and deltas.		
c. sand dunes and valleys.	d. deltas and valleys.		
(B) Give a reason for the following	ng:		
You can see a fossil of whale skel		avers of	
Wadi Al-Hitan formations.			
***************************************		*****************************	
(A) Write the scientific term of ea	ach of the following:		
1. They are scientists who study ro	ocks.	()
2. They are tiny pieces that break	down and float away when r	ocks	
are weathered.		()
3. It is the separated rock layer in	the sedimentary rocks.	()
(B) What happens if?			
	e still water of a lake		
A running water of a river enters a	Journ Water of a lake.		
***************************************		**********************	*********
111111111111111111111111111111111111111			

B Look at the following picture, then put (V) or (X):



Wadi Al-Hitan

This land was covered with a sea 40 millions years ago. This land was covered with a sea 40 millions years ago.	(
1. This land was covered with a sea to limestone and sandstone.	(
 This land was covered with a second sandstone. The layers of this mountain may have limestone and sandstone. The layers of this mountain may have limestone and sandstone. Fossils of shark teeth may be found in the bottom layers of this mountain. 	(
Fossils of shark teeth may be round The top layers of this mountain contain the oldest rocks.	(

Model Exam	To	stal ma	rk
on Theme (4)			
Oli Tir	-	20	
A) Put (v') or (X):		5 man	ks)
A small canyon could be formed due to the effect of water stream o	n		
a flat land.		()
2. Wind can be considered one of the factors that cause weathering.		()
3. The walls of valleys are vertical and steep.		(1
4. The force of gravity pulls rocks down the mountain sides causing		,	
its erosion.		(
(B) Give a reason for the following :			
Mudslides represent a fast change in the landscape.			
(A) Write the scientific term of each of the following:		(5 ma	irk
A gas in air combines with iron of some rocks and causes			
its weatness.	(*******	THE R. P. LEWIS CO., LANSING
2. A process in which large rock is broken into small pieces.	(
3. It is the landform that has steep walls and formed by the effect of			
weathering and erosion due to wind, water or other factors.	(*********	
 They are lowland areas in between mountains and have gently sloped sides around a river. 			
	(*********	*****
(B) What happens to?			
A house that is built close to a river, if the path of the river is change	d tow	ard th	is
house.			

***************************************	**********	*******	
/A) @		(5 m	arl
(A) Choose the correct answer :			

2. All the following are processes that can change the Earth's surface, except

c. weathering.

d. deposition.

b. erosion.

a. digestion.

A) Complete the	following sentence (speed – deposition			(5 marks)
its speed will o				(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
	er of a river travels	down hill on a ste	eep slope,)
of red-colored				()
(B) Correct the u	inderlined words:			
a. Rivers	b. Mountains	c. Dunes	d. Rocks	
4 ca	n erode valleys and	make canyons a	cross them.	
c. short - sho				
a. long - sho	rter	b. long – long d. short – long		
A gentle win carry sand for	d may carry sand for	or a dis	tance, but the	hurricance can

2. Deltas are formed when the of the river water decreases, which causes deposition of sediment.

3. The plants of wetland and their roots cause increase of the rate of process.

4. When the sides of a valley become steep, this valley may be changed into a

(B) Complete the sentence below each picture using the following words: (Weathering - Erosion - Deposition)



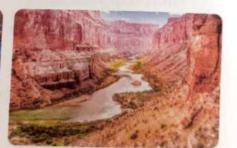
Small rocks of a mountain

..... process.



Formation of new lands at river's end

process.



Carving of a mountain by a river stream

3. process.

Final Examinations
Model Exams On The Second Term



El-Moasser Final Examinations

Model Exam 1

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Model Exam 2

(A) Choose	Corre			
innut ene	correct answer : ergy when using the	e hair dryer is the	energy.	
1. The III	h potential	c. kinetic	d. thermal	
FOWS II	arough turbines in	uams to generate	elicidy.	
e Fossil fuels ne	eed to be	formed under the	Earth's surface.	
a five years		b. ten years		
drads of	fyears	d. millions of	years	
4. The steps of fo	orming fossil fuel,		of the remains of the liv	ing
a. decaying	b. cooling	c. burying	d. heating	
(R) Give a reason	for the following	g :		
Iron inside rocks	may rust.			
11000				
***************************************		***************************************	***************************************	
(A) Complete the	following senter	nces :		
			s to make flour hundreds of	
		sed to dring drain:	s to make moul munureus of	
			s to make flour hundreds of	
years ago, but i	now we use them	to generate		
years ago, but in 2. In any energy community 3. Wood and	now we use them hain, some of the are examples	to generatee e energy is lost in		
years ago, but in 2. In any energy of 3. Wood and	now we use them thain, some of the are examples still fuel.	to generatee e energy is lost in s of biofuel, while	the form of are	
years ago, but it 2. In any energy of 3. Wood and examples of fos 4. When you ride a	now we use them thain, some of the main, some of the main, are examples still fuel.	to generate e energy is lost in s of biofuel, while energy store	the form of are and in your body is converted	
years ago, but in 2. In any energy of 3. Wood and	now we use them thain, some of the main, some of the main, are examples sail fuel. The bicycle, the main are ergy which cause	to generate e energy is lost in s of biofuel, while energy store	the form of are and in your body is converted	
years ago, but in the second s	hain, some of the main, some of the main, some of the main, are examples sil fuel. a bicycle, theergy which cause if?	e energy is lost in sof biofuel, while the energy store the bicycle to me	the form of are and are ed in your body is converted ove.	
years ago, but in the second s	hain, some of the main, some of the main, some of the main, are examples sil fuel. a bicycle, theergy which cause if?	e energy is lost in sof biofuel, while the energy store the bicycle to me	the form of are and in your body is converted	
years ago, but in the second s	hain, some of the main, some of the main, some of the main, are examples sil fuel. a bicycle, theergy which cause if?	e energy is lost in sof biofuel, while the energy store the bicycle to me	the form of are and are ed in your body is converted ove.	
years ago, but in the second s	hain, some of the main, some of the main, some of the main, are examples sil fuel. a bicycle, theergy which cause if?	e energy is lost in sof biofuel, while the energy store the bicycle to me	the form of are and are ed in your body is converted ove.	
years ago, but in the second s	hain, some of the hain, some of the hain, some of the hain, are examples sil fuel. a bicycle, theergy which cause if? sediments of a manner.	e energy is lost in s of biofuel, while energy store the bicycle to me	the form of are and are ed in your body is converted ove.	
years ago, but it 2. In any energy of 3. Wood and examples of fos 4. When you ride a into ene (B) What happens A river erodes the s	chain, some of the chain, some of the chain, some of the chain, are examples still fuel. The bicycle, the chain ergy which cause if? The sediments of a manner of a manner of a manner of a manner of the chain ergo.	e energy is lost in a control of biofuel, while the bicycle to more the bicycle to more allowed and the bicycle to the bicycle to more allowed and the bicycle to the bicycle	the form of are and are ed in your body is converted ove. ong period of time.	
years ago, but it 2. In any energy of 3. Wood and examples of fos 4. When you ride a into	chain, some of the chain, some of the chain, some of the chain, are examples still fuel. The bicycle, the ergy which cause if? The sediments of a manner of a river travels	e energy is lost in a control of biofuel, while the bicycle to more the bicycle to more allowed and the bicycle to the bicycle to more allowed and the bicycle to the bicycle	the form of are and are ed in your body is converted ove. ong period of time.	1
years ago, but it 2. In any energy of 3. Wood and examples of fos 4. When you ride a into	chain, some of the chain, some of the chain, some of the chain, are examples sail fuel. The bicycle, the	e energy is lost in a control of biofuel, while the bicycle to more the bicycle to more allowed and the bicycle to the bicycle to more allowed and the bicycle to the bicycle	the form of are and are ed in your body is converted ove. ong period of time.	1

(B) Look at the following figures, then put $(\sqrt{})$ or (x):





car (2)

1.	The movement of the two cars ca	n be	controlled	from a	distance by	using
	a remote control.					

2. Car (2) use sunlight to move.

3. The two cars can convert the chemical energy stored in their batteries into electrical energy.

4. We can use an electric cable to recharge the battery that is placed in car (1) again if it runs out.

Model Exam 3

1 (A) Choose the correct answer:

 All the following are processes that can change the Earth's surface, except

a. digestion.

b. erosion.

c. weathering.

d. deposition.

2. Electric wires are made of

a. copper.

b. carbon.

c. wood.

d. glass.

3. All the following are forms of fuel, except

a. wood.

b. natural gas. c. gasoline.

d. glass.

4. The Sun provides us with and and

a. sound - heat.

b. light - electricity.

c. sound - light.

d. heat - light.

(B) Give a reason for the following:

The used amount of fossil fuel cannot be replaced as quickly as it is consumed.

2 (A) Correct the underlined words:

 Curiosity is a robotic vehicle that is designed to explore the surface of moon.

2. Hydroelectric energy, is one of non-renewable energy resources.	(
or the state of th	************

small solar panels are used to sup	oply one light bulb with sound energy.
cars depend on fuel as a sour	ce of electrical energy.
(B) What happens if ? You turn on an electric fan.	(according to the change of energy
(A) Choose from column (B) what su	nits it in column (A):

(A)	(B)
Water Wind energy.	a. It needs extreme heat and pressure to be formed from remains of dead plants.
2. Wind energy. 3. Coal.	b. It is the main resource of energy of the Earth's surface
4. The Sun	c. It is gaseous renewable resource of energy.
4, 11.	d. It is a liquid renewable resource of energy.
	e. It is a solid renewable resource of energy.

3. 4.

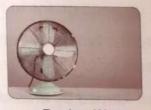
(B) Look at the following figures, then complete the following sentences:



Device (1)



Device (2)



Device (3)



Device (4)

- 1. The electrical energy used to operate devices number
- 2. Kinetic energy is produced in devices and

Model Exam 4

1 (A) Choose the correct answer:

- 1. All the following are renewable energy resources, except
 - a. waterfalls.
- b. coal.
- c. the Sun.
- d. wind.
- 2. Hydroelectric energy is generated from
 - a. waterfalls only.

b. waterfalls and dams.

c. biofuel only.

- d. biofuel and fossil fuel.
- Both hair dryer and electrical water kettle produce energy.
 - a. chemical b. thermal
- c. light
- d. potential

2.

Part -		harned
	onergy to be	recharged
4 Some electric des	vices need energy to be	d. sound
a. electrical	b. thermal	
a. electrical	The state of the s	
(B) Give a reason fo	the lonoving formation of deltas.	
Plants of wetland are	r the following : eas help in formation of deltas.	The state of the s
		ng:
	Fic term of each of the following	our. (
2 (A) Write the scientif	term of the langes into water vapo	our.
4 A process in Willell	1 it is US	60
2 The liquid that store	es chemical energy, and anim	nals and plants
Z. The liquid block	and from remains of dead arm	(
3. A fuel that is produ	ced from remains of dead animurface.	(
under the Earth's s	roduces light from electricity.	
4. It is a device that pi	roduces light from	
18	7	upping out.
(B) What happens II	controlled toy car batteries is r	dilling 5 and
The charge of remote	controlled (c)	***************************************
Sand dunes are the and sandy desert.	ort distance when wind blows	with a great force. (
	Used energy	Produced energy
1.	energy	Light energy and energy

..... energy

..... energy

Model Exam 5

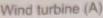
(A) Choose the correct answer :			
(A) Choose the Correct disversion (A) Choose the Choose the Correct disversion (A) Choose the Correct disversion (A) Choose the Choose the Choose the Choose the Choose the Choo	e energy c	hanges into sound energy.	
b. thermal	c. kinetic	d. electrical	
2. Using convergent shee the solar energy.	ts in cooking food i	s one of the benefits of using)
paper b. plastic	c. mirror	d. wooden	
a. Paper 3. River water evaporates by the I	nelp of heat produc	ed from	
a. kettles.	b. the Sun.		
c, electric heaters.	d. electric iron		
Extreme heat and pressure und forming	der the Earth's surf	ace has an important role in	
a. wood. b. wind.	c. fossil fuel.	d. biofuel.	
(B) What happens to ?			
The car fuel indicator if the amount	nt of gasoline in a	car decreases	
***************************************	***************************************		
(A) Put (V) or (X):			
1. Deposition process never char	nge the shape of the	ne land. ()
2. There is a stored chemical end	ergy inside the foo	d we eat. ()
3. Machines make our life more	easier.	()
4. We have to conserve all forms	of fuel.	()
(B) Give a reason for the following	ing:		
Sunlight is very important for pla	nts and animals.		

(A) Complete the following con	4		-
(A) Complete the following sen			
1. When we expose our bodies			
2. The energy can be from			
Sediments are mixed with the layers at the bottom of ocean		and forming	
4. Blowing of strong in t	the desert may for	m large sand dunes.	

(B) If the two wind turbines in front of you are affected by the different wind forces Answer the following questions:

Weak wind







Wind turbine (B)

- 1. Which wind turbine spins faster ? (Give a reason for your answer).
- 2. Which wind turbine generates less electrical energy?

Model Exam 6

1 (A) Choose the correct answer:

- 1. When a river meets a sea or an ocean, a landform known as is formed
 - a. canyon
- b. volcano c. mountain
- d. delta
- 2. Oil is a non-renewable energy resource that is used inside a

- a. flash light. b. car engine. c. electric fan. d. washing machine.
- 3. It takes several for a spacecraft to travel from Earth to Mars.
 - a. seconds
- b. minutes
- c. days d. months
- 4. You feel warm when you rub your hands together, because energy changes into thermal energy.
 - a. kinetic
- b. light
- c. electrical d. sound

(B) What happens if ...?

Sea creatures were buried under the Earth's surface over millions of years.

2 (A) Correct the underlined words:

1. Watermill turbines generate electricity by using the energy of wind movement.

woon is the	main	source	of	energy	on	Earth.	
-------------	------	--------	----	--------	----	--------	--

3. We need sound energy that comes from the Sun, for cooking foods and warming houses.

- 4. Fossil fuel include oil, coal and wood.
- (B) Give a reason for the following:

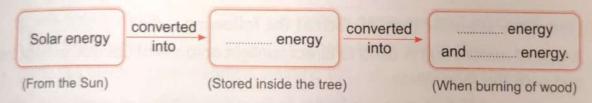
Biofuel is considered as a renewable fuel.

3 (A) Put (V) or (X):

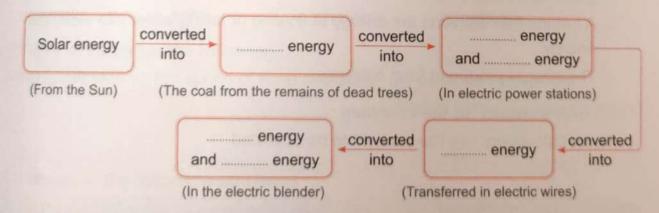
- 1. Both canyons and valleys often have river in their bottom.
 - 2. The walls of valleys are vertical and steep.
 - 3. Deltas are formed as a result of silt deposition.
 - 4. The Nile River pour its water in the Red Sea.
 - (B) Use the following words to complete the energy chains below. (you may use the same word more than once):

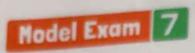
(Thermal - Chemical - Kinetic - Electrical - Sound - Light)

1. The energy chain of burning some branches of a tree :



The energy chain of electric blender.





(A) Choose the correct answer:	and the second by
1. 40 million years ago, Wadi Al-I	Hitan was covered by
2. Sound and energies a	re from output energies when operating the
mobile phone.	c. chemical d. light
a. electrical b. potential	C CHEITHOUT
3. We can use the energy obtaine	od from burning of wood directly in all of the
following situations, except	b. operating television.
a. warming houses.	d. boiling water.
c. cooking food.	d. boiling water
4. When land and water areas on I	Earth absorb the solar energy, the
increases.	b. speed of rotation of Earth
a. temperature on Earth	d. speed of rotation of Sun
c. speed of rotation of moon	d. speed of foldation of Carr
The kinetic energy of wind applied to	to the wind turbines decreases.
The kinetic energy of wind app	
and cook the food inside. 2. It is a form of biofuel, that can be a grass and wood chips. 3. A turbine that converts the energy energy. 4. The energy produced from batteries (B) Give a reason for the following:	made from some types of plants such as of flowing or falling water into electrical (
Some calculators use the sunlight to	be operated.
stations. Put each of the following	electricity is generated in electric power g words in front of its suitable sentence:
1. Its movement produces kinetic ener	3).
It changes kinetic energy into electri	cal energy. (

3. It is a type of nonrenewable resources of energy. 4. It is resulted from heating the water and it turns turbines. (B) Look at the opposite picture, then complete the following sentences. 1. The name of this glass building is 2. The idea of working of this building depends on collecting the energy coming from the Sun. 3. The received energy is converted into energy that warms the inside of this building. 4. In the cold regions, this building allows farmers to plant crops that only grow in climates.	
Model Exam 8	
A) Choose the correct answer: Some kinetic energy is converted into energy due to friction of bike's tire with the road. a. light b. electrical c. potential d. thermal	
Using water to generate electricity depends on places	
c. with weak winds. d. where boats sail in rivers.	
Inside the electric power station, heating of produce steam.	
a. turbines. b. generators. c. water. d. fuel.	
While playing guitar, the energy changes into sound energy.	
a. kinetic. b. light. c. chemical. d. potential.	
Give a reason for the following: then you press on the spring of soap dispenser, the soap moves upward. (according to the change of energy))
complete the following sentences :	
There are two types of weathering which are weathering andweathering.	
Dams control the flow of, that causes the increase of the	

3.	In some villages,	solar panels	are use	d to	generate	 energy that	is user
	to operate	equipment.				 11.00	-00

- 4. Sand dunes are in continuous motion due to the movement of
- (B) What happens if ...?

You turn on the T.V.

(according to the change of energy)

(A) Give one example for each of the following:

- 1. A renewable resource of energy:
- 2. A non-renewable resource of energy:
- 3. A method of conserving fossil fuel:
- 4. A disadvantage of using fossil fuel in energy production :

(B) Look at the following figures, then complete the following energy chain:



Figure (1)



Figure (2)



Figure (3)



Figure (4)



Figure (5)

Energy in figure

converted into

Chemical energy stored in figure

converted into

Thermal energy and kinetic energy in figure

Thermal energy that is produced from the device in figure converted

Electrical energy that is travelled through figure

converted

Model Exam 9

(A) Choose the correct answer :				
	drums is the	energy.		
chemical b. light	C. sound	d. potential		
if the rain falls over a canyon for	several times per y	ear,		
a. its depth increases.	b. its depth decr	b. its depth decreases.		
it becomes flat.	d. it is not be affected.			
3. When the windmill blades rotates generating energy.	s, this causes wind	turbines to rotate an	nd	
a. electrical b. solar	c. chemical	The state of the s		
4. All the following are forms of foss	sil fuel, except			
a. water. b. coal.	c. natural gas.			
(B) What happens if?				
A generator in an electric power sta	ation is damaged.			
(A) Put (V) or (X):				
1. Energy may be destroyed inside	different devices.		()
Grinding of biscuits by hands int mechanical weathering of rocks.		the same effect of	()
3. The movement of a generator in	electric power sta	tions produces pote	ntial	
energy.			()
4. The amount of oil on Earth is lim	nited.		()
(B) Write the scientific term of each	ch of the following			
1. Process in which rocks are brok)
2. Process in which small broken r				
of wind or water.	ooko more nom a			
(A) Complete the following senter	nces :			
1. The origin of sand is the breaking		/pes of		
2. The type of weathering in which			preser	ice
of plant roots is known as				
				55

3. The change of electrical energy into sound energy in the radio is an example that proves the law of 4. The natural resources that can be replaced shortly after being used are called resources of energy. (B) Mention the input and output energies of the opposite device: 1. Input energy: 2. Output energy: 2. Output energy: 3. Running bicycle. 4. Running bicycle. 5. Running person. 2. Curiosity rover is designed to explore			Man and the					
4. The natural resources that can be replaced shortly after being used are called resources of energy. (B) Mention the input and output energies of the opposite device: 1. Input energy: 2. Output energy: 1. Which of the following is a renewable energy resources? 2. Running bicycle. 3. Running bicycle. 4. Running water. 5. Running water. 6. Running person. 7. Curiosity rover is designed to explore	3. The change of electrical energy	into sound energy if	the radio is an example					
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a. Running bicycle. c. Running water. d. Running person. 2. Curiosity rover is designed to explore	(A) Choose the correct answer:		2					
c. Running water. d. Running person. 2. Curiosity rover is designed to explore	1. Which of the following is a renewable energy resources ?							
2. Curiosity rover is designed to explore	d. Tadilining Dicyclo.							
a. Earth planet. b. Mars planet. c. the Sun. d. the moon. 3. The change of energy in an	c. Running water. d. Running person.							
3. The change of energy in an	2. Curiosity rover is designed to exp							
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4. All the following factors play an important role in the formation of fossil fuel, except a. extreme pressure. b. extreme heat. c. the moon light. d. rocks and sediment. (B) Give a reason for the following: Coal is considered as a nonrenewable energy resource. (A) Write the scientific term of each of the following: 1. The matter that produces steam on heating, which is used to turn turbines in electric power station. 2. A mill that is turned by water flow. 3. Process in which the sediments are dropped in a new location by the action of wind, water, ice and gravity. (a wind turbine.							
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2. A mill that is turned by water flow. 3. Process in which the sediments are dropped in a new location by the action of wind, water, ice and gravity. (i neating, which is						
Process in which the sediments are dropped in a new location by the action of wind, water, ice and gravity. ((
wind, water, ice and gravity.			(
4. The energy used to play a drum.		dropped in a new	location by the action of					
	4. The energy used to play a drum.		()					

- what	t happens if?		
(B) *****	your hands near the lighted lam	ip.	
You put		******************************	
	a parameter and a parameter an		
	CONTROL OF THE PROPERTY OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS	2. On the second	

(A) Correct the underlined words :

- 1. The amount of biofuel that is consumed, cannot be replaced as quickly as it is used.
- 2. Dams are built on rivers in order to generate solar energy.
- 3. The origin of sand is the breaking down of some types of glass. (______)
- 4. Plant roots help in the formation of rocks.

(B) Look at these electric devices, then complete the following sentences:







Device (2)



Device (3)

- Sound and light energies are produced in the device number and help it to do its function.
- 3. Noise from devices number and is wasted energy, because sound doesn't help the devices do their functions.
- 4. All of these devices are operated by energy that is transmitted from stations through wires.